MULTI-STEP BIDDING PROCESS
FOR
CONTRACTORS

Request for Solicitation For Construction Services

Stage II – General Contractors Bidders List FY09

June 4, 2008

RICHFIELD UHP/ DTS ALTERNATE DISPATCH MODIFICATION

DEPARTMENT OF PUBLIC SAFETY
RICHFIELD, UTAH

DFCM Project No. 06298550

WHW Engineering
8619 South Sandy Parkway #101
Sandy, Utah 84070

TABLE OF CONTENTS

Current copies of the following documents are hereby made part of these contract documents by reference. These documents are available on the DFCM web site at http://dfcm.utah.gov or are available upon request from DFCM:

DFCM Supplemental General Conditions dated May 5, 2008
DFCM General Conditions dated May 25, 2005
DFCM Application and Certificate for Payment dated May 25, 2005

Technical Specifications & Drawings: WHW Engineering Inc.

The Agreement and General Conditions dated May 25, 2005 have been updated from versions that were formally adopted and in use prior to this date. The changes made to the General Conditions are identified in a document entitled Revisions to General Conditions that is available on DFCM's web site at http://dfcm.utah.gov

INVITATION TO BID

ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT

The State of Utah - Division of Facilities Construction and Management (DFCM) is requesting bids for the construction of the following project:

RICHFIELD UHP/DTS ALTERNATE DISPATCH MODIFICATION
DEPARTMENT OF PUBLIC SAFETY – RICHFIELD, UTAH
DFCM PROJECT NO: 06298550

Project Description: Modification of interior office space for a new alternate dispatch location. This project shall include modification of interior walls and installation of new ceiling, carpet, electrical and HVAC. Construction Cost Estimate: $280,000.00.

Company	Contact	Fax	Company	Contact	Fax
Arnell-West, Inc	Jason Arnell	(801) 975-9967	Hughes General Contr	Dan Pratt	(801) 295-0530
Ascent Construction	Brad L. Knowlton	(801) 299-0663	JC Construction	John Cecala	(801) 262-7966
Bailey Construction Co	Tracy Bailey	(435) 245-6413	Keller Construction	S. Daniel Hill	(801) 972-1063
Benstog Construction Corp	Patrick Benstog	(801) 399-1335	Layton Construction Co	Steve Bowers	(801) 563-4863
Big-D Construction	Ryan Carter	(801) 415-6900	McCullough Engineering	Jim McCullough	(801) 466-4989
Bradley Construction	Brad Piggott	(801) 298-6308	Menlove Construction	Mike Menlove	(801) 282-6887
Broderick & Henderson	Gary Broderick	(801) 225-4697	MW Construction Inc	Bill Shuldverg	(435) 245-4660
Bud Mahas Construction	Steve Mahas	(801) 531-0314	Onyx Construction	Mike Phillips	(801) 878-8922
CECI	Brian E. Bagnell	(801) 484-4040	Rueckert Construction Co	Ken M. Rueckert	(801) 253-1774
Chad Husband Const	Richard Marshall	(801) 886-1784	Spindler Construction Corp	Gary R. Stevens	(435) 753-0728
CSM Construction Inc	Dan Noorda	(801) 280-2813	Velocity Construction	J. Scott Wilson	(435) 586-4968
Darrell Anderson Const	James Anderson	(435) 752-7606	Veritas Inc	Dan A. Parkinson	(801) 572-5899
Entelen Design-Build LLC	Steven R. Burt	(801) 517-4398	Wade Payne Const	Wade Payne	(801) 226-7772
Garff Construction	Phil Henricksen	(801) 972-1928	Wasatch West Const	JD Tyrrell	(801) 299-8541
Hidden Peak Electric Co	Derek Lee	(801) 262-5689			

The bid documents will be available at 2:00 PM on Wednesday, June 4, 2008 in electronic format only on CDs from DFCM at 4110 State Office Building, Salt Lake City, Utah 84114, telephone (801)538-3018 and on the DFCM web page at http://dfcm.utah.gov. For questions regarding this project, please contact Jim Russell, Project Manager, DFCM, at (801)-231-3489. No others are to be contacted regarding this project.

A **MANDATORY** pre-bid meeting and site visit will be held at 10:00 AM on Monday, June 16, 2008 at the Richfield DTS, 550 South 900 West, Richfield, Utah. All pre-qualified prime contractors wishing to bid on this project must attend this meeting.

Bids must be submitted by 3:00 PM on Thursday, June 26, 2008 to DFCM, 4110 State Office Building, Salt Lake City, Utah 84114. Bids will be opened and read aloud in the DFCM Conference Room, 4110 State Office Building, Salt Lake City, Utah. Note: Bids must be received at 4110 State Office Building by the specified time. The contractor shall comply with and require all of its subcontractors to comply with the license laws as required by the State of Utah.

A bid bond in the amount of five percent (5%) of the bid amount, made payable to the Division of Facilities Construction and Management on DFCM's bid bond form, shall accompany the bid.

The Division of Facilities Construction & Management reserves the right to reject any or all bids or to waive any formality or technicality in any bid in the interest of the State.

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
MARLA WORKMAN, CONTRACT COORDINATOR
4110 State Office Bldg., Salt Lake City, Utah 84114

STAGE II - MULTI-STEP BIDDING PROCESS

ONLY FIRMS PRE-QUALIFIED DURING STAGE I OF THE RFS ARE ALLOWED TO BID ON THIS PROJECT

1. Invitational Bid Procedures

The following is an overview of the invitational bid process. More detailed information is contained throughout the document. Contractors are responsible for reading and complying with all information contained in this document.

Notification: DFCM will notify each registered pre-qualified firm (via fax or e-mail) when a project is ready for Construction Services and invite them to bid on the project.

Description of Work: A description of work or plans/specifications will be given to each contractor. If required, the plans and specifications will be available on the DFCM web page at http://dfcm.utah.gov and on CDs from DFCM, at 4110 State Office Building, Salt Lake City, Utah 84114.

Schedule: The Stage II Schedule shows critical dates including the mandatory pre-bid site meeting (if required), the question and answer period, the bid submittal deadline, the subcontractor list submittal deadline, etc. Contractors are responsible for meeting all deadlines shown on the schedule.

Mandatory Pre-Bid Site Meeting: If a firm fails to attend a pre-bid site meeting labeled "Mandatory" they will not be allowed to bid on the project. At the mandatory meeting, contractors may have an opportunity to inspect the site, receive additional instructions and ask questions about project. The schedule contains information on the date, time, and place of the mandatory pre-bid site meeting.

Written Questions: All questions must be in writing and directed to DFCM's project manager assigned to this project. No others are to be contacted regarding this project. The schedule contains information on the deadline for submitting questions.

Addendum: All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda may result in disqualification from bidding.

Submitting Bids: Bids must be submitted to DFCM 4110 State Office Building, Salt Lake City, Utah 84114 by the deadline indicated on the schedule. Bids submitted after the deadline will not be accepted. Bids will be opened at DFCM on the date, time, and place indicated on the schedule.

Subcontractors List: The firm selected for the project must submit a list of all subcontractors by the deadline indicated on the schedule contained in this document.

Pre-qualified List of Contractors: Contractors shall remain on DFCM's list of pre-qualified contractors provided: (a) they maintain a performance rating of 3.5 or greater on each project, (b) they are not suspended for failure to comply with requirements of their contract, (c) the firm has not undergone a significant reorganization involving the loss of key personnel (site superintendents, project managers, owners, etc.) to a degree such that the firm no longer meets the pre-qualification requirements outlined in Stage I, (d) the financial viability of the firm has not significantly changed, and (e) the firm is not otherwise disqualified by DFCM. Note: If a contractor fails to comply with items (a) through (e) above,

They may be removed from DFCM's list of pre-qualified contractors following an evaluation by a review committee. Contractors will be given the opportunity to address the review committee before a decision is made. Pre-qualified contractors are ONLY authorized to bid on projects within the discipline that they were originally pre-qualified under.

2. Drawings and Specifications and Interpretations

Drawings, specifications and other contract documents may be obtained as stated in the Invitation to Bid. If any firm is in doubt as to the meaning or interpretation of any part of the drawings, specifications, scope of work or contract documents, they shall submit, in writing, a request for interpretation to the authorized DFCM representative by the deadline identified in the schedule. Answers to questions and interpretations will be made via addenda issued by DFCM. Neither DFCM or the designer shall be responsible for incorrect information obtained by contractors from sources other than the official drawings/specifications and addenda issued by DFCM.

3. Product Approvals

Where reference is made to one or more proprietary products in the contract documents, but restrictive descriptive materials of one or more manufacturer(s) is referred to in the contract documents, the products of other manufacturers will be accepted, provided they equal or exceed the standards set forth in the drawings and specifications and are compatible with the intent and purpose of the design, subject to the written approval of the Designer. Such written approval must occur prior to the deadline established for the last scheduled addendum to be issued. The Designer's written approval will be included as part of the addendum issued by DFCM. If the descriptive material is not restrictive, the products of other manufacturers specified will be accepted without prior approval provided they are compatible with the intent and purpose of the design as determined by the Designer.

4. Addenda

All clarifications from DFCM will be in writing and issued as an addendum to the RFS. Addenda will be posted on DFCM's web site at http://dfcm.utah.gov. Contractors are responsible for obtaining information contained in each addendum from the web site. Addenda issued prior to the submittal deadline shall become part of the bidding process and must be acknowledged on the bid form. Failure to acknowledge addenda shall result in disqualification from bidding. DFCM shall not be responsible for incorrect information obtained by contractors from sources other than official addenda issued by DFCM.

5. Financial Responsibility of Contractors, Subcontractors and Sub-subcontractors

Contractors shall respond promptly to any inquiry in writing by DFCM to any concern of financial responsibility of the Contractor, Subcontractor or Sub-subcontractor. Failure to respond may result in suspension from DFCM's list of pre-qualified contractors.

6. Licensure

The Contractor shall comply with and require all of its Subcontractors to comply with the license laws as required by the State of Utah.

7. Permits

In concurrence with the requirements for permitting in the general conditions, it is the responsibility of the contractor to obtain the fugitive dust plan requirements from the Utah Division of Air Quality and the SWPPP requirements from the Utah Department of Environmental Quality and submit the completed forms and pay any permit fee that may be required for this specific project. Failure to obtain the required permit may result in work stoppage and/or fines from the regulating authority that will be the sole responsibility of the contractor. Any delay to the project as a result of any such failure to obtain the permit or noncompliance with the permit shall not be eligible for any extension in the Contract Time.

8. Time is of the Essence

Time is of the essence in regard to all the requirements of the contract documents.

9. Bids

Before submitting a bid, each bidder shall carefully examine the contract documents; shall visit the site of the work; shall fully inform themselves as to all existing conditions and limitations; and shall include in the bid the cost of all items required by the contract documents including those added via addenda. If the bidder observes that portions of the contract documents are at variance with applicable laws, building codes, rules, regulations or contain obvious erroneous or uncoordinated information, the bidder shall promptly notify the DFCM Project Manager prior to the bidding deadline. Changes necessary to correct these issues will be made via addenda issued by DFCM.

The bid, bearing original signatures, must be typed or handwritten in ink on the Bid Form provided in the procurement documents and submitted in a sealed envelope at the location specified by the Invitation to Bid prior to the published deadline for the submission of bids.

Bid bond security, in the amount of five percent (5%) of the bid, made payable to the Division of Facilities Construction and Management, shall accompany bid. THE BID BOND MUST BE ON THE BID BOND FORM PROVIDED IN THE PROCUREMENT DOCUMENTS IN ORDER TO BE CONSIDERED AN ACCEPTABLE BID.

If the bid bond security is submitted on a form other than DFCM's required bid bond form, and the bid security meets all other legal requirements, the bidder will be allowed to provide an acceptable bid bond by the close of business on the next business day following notification by DFCM of submission of a defective bid bond security. **A cashier's check cannot be used as a substitute for a bid bond.**

10. Listing of Subcontractors

Listing of Subcontractors shall be as summarized in the "Instructions and Subcontractor's List Form", included as part of the contract documents. The subcontractors list shall be delivered to DFCM or faxed to DFCM at (801) 538-3677 within 24 hours of the bid opening. Requirements for listing additional subcontractors will be listed in the contract documents.

DFCM retains the right to audit or take other steps necessary to confirm compliance with requirements for the listing and changing of subcontractors. Any contractor who is found to not be in compliance with these requirements may be suspended from DFCM's list of pre-qualified contractors.

11. Contract and Bond

The Contractor's Agreement will be in the form provided in this document. The duration of the contract shall be for the time indicated by the project completion deadline shown on the schedule. The successful bidder, simultaneously with the execution of the Contractor's Agreement, will be required to furnish a performance bond and a payment bond, both bearing original signatures, upon the forms provided in the procurement documents.

The performance and payment bonds shall be for an amount equal to one hundred percent (100%) of the Contract Sum and secured from a company that meets the requirements specified in the requisite forms. Any bonding requirements for Subcontractors will be specified in the Supplementary General Conditions.

12. Award of Contract

The Contract will be awarded as soon as possible to the lowest, responsive and responsible bidder, based on the lowest combination of base bid and acceptable prioritized alternates, provided the bid is reasonable, is in the interests of DFCM to accept and after applying the Utah Preference Laws in U.C.A. Title 63, Chapter 56. DFCM reserves the right to waive any technicalities or formalities in any bid or in the bidding. Alternates will be accepted on a prioritized basis with Alternate 1 being highest priority, Alternate 2 having second priority, etc. Alternates will be selected in prioritized order up to the construction cost estimate.

13. Right to Reject Bids

DFCM reserves the right to reject any or all Bids.

14. Withdrawal of Bids

Bids may be withdrawn on written request received from bidders within 24 hours after the bid opening if the contractor has made an error in preparing the bid.

15. DFCM Contractor Performance Rating

As a contractor completes each project, DFCM will evaluate project performance based on the enclosed "DFCM Contractor Performance Rating" form. The ratings issued on this project may affect the firm's "pre-qualified" status and their ability to obtain future work with DFCM.

Stage II
PROJECT SCHEDULE

PROJECT NAME: **RICHFIELD UHP/DTS ALTERNATE DISPATCH MODIFICATION DEPARTMENT OF PUBLIC SAFETY – RICHFIELD, UTAH**
DFCM PROJECT #: **06298550**

Event	Day	Date	Time	Place
Stage II Bidding Documents Available	Wednesday	June 4, 2008	2:00 PM	DFCM 4110 State Office Building SLC, UT and the DFCM web site*
Mandatory Pre-bid Site Meeting	Monday	June 16, 2008	10:00 AM	Richfield DTS 550 South 900 West Richfield, UT
Deadline for Submitting Questions	Friday	June 20, 2008	2:00 PM	Jim Russell – DFCM E-mail: jimrussell@utah.gov Fax (801)-538-3267
Addendum Deadline (exception for bid delays)	Tuesday	June 24, 2008	2:00 PM	DFCM web site*
Prime Contractors Turn in Bid and Bid Bond	Thursday	June 26, 2008	3:00 PM	DFCM 4110 State Office Building SLC, UT
Subcontractors List Due	Friday	June 27, 2008	3:00 PM	DFCM 4110 State Office Building SLC, UT Fax 801-538-3677
Substantial Completion Date	Friday	November 14, 2008		

* **NOTE: DFCM's web site address is http://dfcm.utah.gov**

BID FORM

NAME OF BIDDER _____ DATE _____

To the Division of Facilities Construction and Management
4110 State Office Building
Salt Lake City, Utah 84114

The undersigned, responsive to the "Invitation to Bid" and in accordance with the Request for Bids for the **RICHFIELD UHP/DTS ALTERNATE DISPATCH MODIFICATION – DEPARTMENT OF PUBLIC SAFETY – RICHFIELD, UTAH - DFCM PROJECT NO. 06298550** and having examined the Contract Documents and the site of the proposed Work and being familiar with all of the conditions surrounding the construction of the proposed Project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies as required for the Work in accordance with the Contract Documents as specified and within the time set forth and at the price stated below. This price is to cover all expenses incurred in performing the Work required under the Contract Documents of which this bid is a part:

I/We acknowledge receipt of the following Addenda: _____

For all work shown on the Drawings and described in the Specifications and Contract Documents, I/we agree to perform for the sum of:

_____ DOLLARS ($_____)
(In case of discrepancy, written amount shall govern)

I/We guarantee that the Work will be Substantially Complete by **November 14, 2008**, should I/we be the successful bidder, and agree to pay liquidated damages in the amount of **$500.00** per day for each day after expiration of the Contract Time as stated in Article 3 of the Contractor's Agreement.

This bid shall be good for 45 days after bid opening.

Enclosed is a 5% bid bond, as required, in the sum of _____

The undersigned Contractor's License Number for Utah is _____.

Upon receipt of notice of award of this bid, the undersigned agrees to execute the contract within ten (10) days, unless a shorter time is specified in Contract Documents, and deliver acceptable Performance and Payment bonds in the prescribed form in the amount of 100% of the Contract Sum for faithful performance of the contract. The Bid Bond attached, in the amount not less than five percent (5%) of the above bid sum, shall become the property of the Division of Facilities Construction and Management as liquidated damages for delay and additional expense caused thereby in the event that the contract is not executed and/or acceptable l00% Performance and Payment bonds are not delivered within time set forth.

Type of Organization: _____
(Corporation, Partnership, Individual, etc.)

Any request and information related to Utah Preference Laws:

_____

Respectfully submitted,

_____
Name of Bidder

ADDRESS:

_____

_____

_____
Authorized Signature

BID BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed, (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the STATE OF UTAH, hereinafter referred to as the "Obligee," in the amount of $_____ (5% of the accompanying bid), being the sum of this Bond to which payment the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that whereas the Principal has submitted to Obligee the accompanying bid incorporated by reference herein, dated as shown, to enter into a contract in writing for the _____ Project.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the said principal does not execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the principal, then the sum of the amount stated above will be forfeited to the State of Utah as liquidated damages and not as a penalty; if the said principal shall execute a contract and give bond to be approved by the Obligee for the faithful performance thereof within ten (10) days after being notified in writing of such contract to the Principal, then this obligation shall be null and void. It is expressly understood and agreed that the liability of the Surety for any and all defaults of the Principal hereunder shall be the full penal sum of this Bond. The Surety, for value received, hereby stipulates and agrees that obligations of the Surety under this Bond shall be for a term of sixty (60) days from actual date of the bid opening.

PROVIDED, HOWEVER, that this Bond is executed pursuant to provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the above bounden parties have executed this instrument under their several seals on the date indicated below, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

DATED this _____ day of _____, 20_____ .

Principal's name and address (if other than a corporation):

_____

_____

By: _____

Title: _____

Principal's name and address (if a corporation):

_____

_____

By: _____

Title: _____

(Affix Corporate Seal)

Surety's name and address:

_____

_____

By: _____
Attorney-in-Fact

(Affix Corporate Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this ____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.
My Commission Expires: _____
Resides at: _____

_____
NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

INSTRUCTION AND SUBCONTRACTORS LIST FORM

The three low bidders, as well as all other bidders that desire to be considered, are required by law to submit to DFCM within 24 hours of bid opening a list of **ALL** first-tier subcontractors, including the subcontractor's name, bid amount and other information required by Building Board Rule and as stated in these Contract Documents, based on the following:

DOLLAR AMOUNTS FOR LISTING

PROJECTS UNDER $500,000: **ALL FIRST-TIER SUBS $20,000 OR OVER MUST BE LISTED**
PROJECTS $500,000 OR MORE: **ALL FIRST-TIER SUBS $35,000 OR OVER MUST BE LISTED**

- Any additional subcontractors identified in the bid documents shall also be listed.
- The DFCM Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law.
- List subcontractors for base bid as well as the impact on the list that the selection of any alternate may have.
- Bidder may not list more than one subcontractor to perform the same work.
- If there are no subcontractors for the job that are required to be reported by State law (either because there are no subcontractors that will be used on the project or because there are no first-tier subcontractors over the dollar amounts referred to above), then you do not need to submit a sublist. If you do not submit a sublist, it will be deemed to be a representation by you that there are no subcontractors on the job that are required to be reported under State law. At any time, DFCM reserves the right to inquire, for security purposes, as to the identification of the subcontractors at any tier that will be on the worksite.

LICENSURE:

The subcontractor's name, the type of work, the subcontractor's bid amount, and the subcontractor's license number as issued by DOPL, if such license is required under Utah Law, shall be listed. Bidder shall certify that all subcontractors, required to be licensed, are licensed as required by State law. A subcontractor includes a trade contractor or specialty contractor and does not include suppliers who provide only materials, equipment, or supplies to a contractor or subcontractor.

'SPECIAL EXCEPTION':

A bidder may list 'Special Exception' in place of a subcontractor when the bidder intends to obtain a subcontractor to perform the work at a later date because the bidder was unable to obtain a qualified or reasonable bid under the provisions of U.C.A.Section 63A-5-208(4). The bidder shall insert the term 'Special Exception' for that category of work, and shall provide documentation with the subcontractor list describing the bidder's efforts to obtain a bid of a qualified subcontractor at a reasonable cost and why the bidder was unable to obtain a qualified subcontractor bid. The Director must find that the bidder complied in good faith with State law requirements for any 'Special Exception' designation, in order for the bid to be considered. If awarded the contract, the Director shall supervise the bidder's efforts to obtain a qualified subcontractor bid. The amount of the awarded contract may not be adjusted to reflect the actual amount of the subcontractor's bid. Any listing of 'Special Exception' on the sublist form shall also include amount allocated for that work.

GROUNDS FOR DISQUALIFICATION:

The Director may not consider any bid submitted by a bidder if the bidder fails to submit a subcontractor list meeting the requirements of State law. Director may withhold awarding the contract to a particular bidder if one or more of the proposed subcontractors are considered by the Director to be unqualified to do the Work or for such

other reason in the best interest of the State of Utah. Notwithstanding any other provision in these instructions, if there is a good faith error on the sublist form, at the sole discretion of the Director, the Director may provide notice to the contractor and the contractor shall have 24 hours to submit the correction to the Director. If such correction is submitted timely, then the sublist requirements shall be considered met.

CHANGES OF SUBCONTRACTORS SPECIFICALLY IDENTIFIED ON SUBLIST FORM:

Subsequent to twenty-four hours after the bid opening, the contractor may change its listed subcontractors only after receiving written permission from the Director based on complying with all of the following criteria.

(1) The contractor has established in writing that the change is in the best interest of the State and that the contractor establishes an appropriate reason for the change, which may include, but not is not limited to, the following reasons: the original subcontractor has failed to perform, or is not qualified or capable of performing, and/or the subcontractor has requested in writing to be released.
(2) The circumstances related to the request for the change do not indicate any bad faith in the original listing of the subcontractors.
(3) Any requirement set forth by the Director to ensure that the process used to select a new subcontractor does not give rise to bid shopping.
(4) Any increase in the cost of the subject subcontractor work is borne by the contractor.
(5) Any decrease in the cost of the subject subcontractor work shall result in a deductive change order being issued for the contract for such decreased amount.
(6) The Director will give substantial weight to whether the subcontractor has consented in writing to being removed unless the Contractor establishes that the subcontractor is not qualified for the work.

EXAMPLE:

Example of a list where there are only four subcontractors:

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONTRACTOR LICENSE #
ELECTRICAL	ABCD Electric Inc.	$350,000.00	123456789000
LANDSCAPING	"Self" *	$300,000.00	123456789000
CONCRETE (ALTERNATE #1)	XYZ Concrete Inc	$298,000.00	987654321000
MECHANICAL	"Special Exception" (attach documentation)	Fixed at: $350,000.00	(TO BE PROVIDED AFTER OBTAINING SUBCONTRACTOR)

* Bidders may list "self", but it is not required.

PURSUANT TO STATE LAW - SUBCONTRACTOR BID AMOUNTS CONTAINED IN THIS SUBCONTRACTOR LIST SHALL NOT BE DISCLOSED UNTIL THE CONTRACT HAS BEEN AWARDED.

SUBCONTRACTORS LIST
FAX TO 801-538-3677

PROJECT TITLE: _____

Caution: You must read and comply fully with instructions.

TYPE OF WORK	SUBCONTRACTOR, "SELF" OR "SPECIAL EXCEPTION"	SUBCONTRACTOR BID AMOUNT	CONT. LICENSE #

We certify that:

l. This list includes all subcontractors as required by the instructions, including those related to the base bid as well as any alternates.
2. We have listed "Self" or "Special Exception" in accordance with the instructions.
3. All subcontractors are appropriately licensed as required by State law.

FIRM: _____

DATE: _____ SIGNED BY: _____

NOTICE: FAILURE TO SUBMIT THIS FORM, PROPERLY COMPLETED AND SIGNED, AS REQUIRED IN THESE CONTRACT DOCUMENTS, SHALL BE GROUNDS FOR OWNER'S REFUSAL TO ENTER INTO A WRITTEN CONTRACT WITH BIDDER. ACTION MAY BE TAKEN AGAINST BIDDERS BID BOND AS DEEMED APPROPRIATE BY OWNER. ATTACH A SECOND PAGE IF NECESSARY.

CONTRACTOR'S AGREEMENT

FOR:

_____
_____
_____

THIS CONTRACTOR'S AGREEMENT, made and entered into this ____ day of _____, 20__, by and between the DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT, hereinafter referred to as "DFCM", and _____, incorporated in the State of _____ and authorized to do business in the State of Utah, hereinafter referred to as "Contractor", whose address is _____.

WITNESSETH: WHEREAS, DFCM intends to have Work performed at _____ _____.

WHEREAS, Contractor agrees to perform the Work for the sum stated herein.

NOW, THEREFORE, DFCM and Contractor for the consideration provided in this Contractor's Agreement, agree as follows:

ARTICLE 1. SCOPE OF WORK. The Work to be performed shall be in accordance with the Contract Documents prepared by _____ and entitled "_____."

The DFCM General Conditions ("General Conditions") dated May 25, 2005 and Supplemental General Conditions dated May 5, 2008 ("also referred to as General Conditions") and on file at the office of DFCM and available on the DFCM website, are hereby incorporated by reference as part of this Agreement and are included in the specifications for this Project. All terms used in this Contractor's Agreement shall be as defined in the Contract Documents, and in particular, the General Conditions.

The Contractor Agrees to furnish labor, materials and equipment to complete the Work as required in the Contract Documents which are hereby incorporated by reference. It is understood and agreed by the parties hereto that all Work shall be performed as required in the Contract Documents and shall be subject to inspection and approval of DFCM or its authorized representative. The relationship of the Contractor to the DFCM hereunder is that of an independent Contractor.

ARTICLE 2. CONTRACT SUM. The DFCM agrees to pay and the Contractor agrees to accept in full performance of this Contractor's Agreement, the sum of _____ _____ DOLLARS AND NO CENTS ($_____.00), which is the base bid, and which sum also includes the cost of a 100%

Performance Bond and a 100% Payment Bond as well as all insurance requirements of the Contractor. Said bonds have already been posted by the Contractor pursuant to State law. The required proof of insurance certificates have been delivered to DFCM in accordance with the General Conditions before the execution of this Contractor's Agreement.

ARTICLE 3. TIME OF COMPLETION AND DELAY REMEDY. The Work shall be Substantially Complete by _____. Contractor agrees to pay liquidated damages in the amount of $_____ per day for each day after expiration of the Contract Time until the Contractor achieves Substantial Completion in accordance with the Contract Documents, if Contractor's delay makes the damages applicable. The provision for liquidated damages is: (a) to compensate the DFCM for delay only; (b) is provided for herein because actual damages can not be readily ascertained at the time of execution of this Contractor's Agreement; (c) is not a penalty; and (d) shall not prevent the DFCM from maintaining Claims for other non-delay damages, such as costs to complete or remedy defective Work.

No action shall be maintained by the Contractor, including its or Subcontractor or suppliers at any tier, against the DFCM or State of Utah for damages or other claims due to losses attributable to hindrances or delays from any cause whatsoever, including acts and omissions of the DFCM or its officers, employees or agents, except as expressly provided in the General Conditions. The Contractor may receive a written extension of time, signed by the DFCM, in which to complete the Work under this Contractor's Agreement in accordance with the General Conditions.

ARTICLE 4. CONTRACT DOCUMENTS. The Contract Documents consist of this Contractor's Agreement, the Conditions of the Contract (DFCM General Conditions, Supplementary and other Conditions), the Drawings, Specifications, Addenda and Modifications. The Contract Documents shall also include the bidding documents, including the Notice to Contractors, Instructions to Bidders/Proposers and the Bid/Proposal, to the extent not in conflict therewith and other documents and oral presentations that are documented as an attachment to the contract.

All such documents are hereby incorporated by reference herein. Any reference in this Contractor's Agreement to certain provisions of the Contract Documents shall in no way be construed as to lessen the importance or applicability of any other provisions of the Contract Documents.

ARTICLE 5. PAYMENT. The DFCM agrees to pay the Contractor from time to time as the Work progresses, but not more than once each month after the date of Notice to Proceed, and only upon Certificate of the A/E for Work performed during the preceding calendar month, ninety-five percent (95%) of the value of the labor performed and ninety-five percent (95%) of the value of materials furnished in place or on the site. The Contractor agrees to furnish to the DFCM invoices for materials purchased and on the site but not installed, for which the Contractor requests payment and agrees to safeguard and protect such equipment or materials and is responsible for safekeeping thereof and if such be stolen, lost or destroyed, to replace same.

Such evidence of labor performed and materials furnished as the DFCM may reasonably require shall be supplied by the Contractor at the time of request for Certificate of Payment on account. Materials for which payment has been made cannot be removed from the job site without DFCM's written approval. Five percent (5%) of the earned amount shall be retained from each monthly payment. The retainage, including any additional retainage imposed and the release of any retainage, shall be in accordance with UCA 13-8-5 as amended. Contractor shall also comply with the requirements of UCA 13-8-5, including restrictions of retainage regarding subcontractors and the distribution of interest earned on the retention proceeds. The DFCM shall not be responsible for enforcing the Contractor's obligations under State law in fulfilling the retention law requirements with subcontractors at any tier.

ARTICLE 6. INDEBTEDNESS. Before final payment is made, the Contractor must submit evidence satisfactory to the DFCM that all payrolls, materials bills, subcontracts at any tier and outstanding indebtedness in connection with the Work have been properly paid. Final Payment will be made after receipt of said evidence, final acceptance of the Work by the DFCM as well as compliance with the applicable provisions of the General Conditions.

Contractor shall respond immediately to any inquiry in writing by DFCM as to any concern of financial responsibility and DFCM reserves the right to request any waivers, releases or bonds from Contractor in regard to any rights of Subcontractors (including suppliers) at any tier or any third parties prior to any payment by DFCM to Contractor.

ARTICLE 7. ADDITIONAL WORK. It is understood and agreed by the parties hereto that no money will be paid to the Contractor for additional labor or materials furnished unless a new contract in writing or a Modification hereof in accordance with the General Conditions and the Contract Documents for such additional labor or materials has been executed. The DFCM specifically reserves the right to modify or amend this Contractor's Agreement and the total sum due hereunder either by enlarging or restricting the scope of the Work.

ARTICLE 8. INSPECTIONS. The Work shall be inspected for acceptance in accordance with the General Conditions.

ARTICLE 9. DISPUTES. Any dispute, PRE or Claim between the parties shall be subject to the provisions of Article 7 of the General Conditions. DFCM reserves all rights to pursue its rights and remedies as provided in the General Conditions.

ARTICLE 10. TERMINATION, SUSPENSION OR ABANDONMENT. This Contractor's Agreement may be terminated, suspended or abandoned in accordance with the General Conditions.

ARTICLE 11. DFCM'S RIGHT TO WITHHOLD CERTAIN AMOUNT AND MAKE USE THEREOF. The DFCM may withhold from payment to the Contractor such amount as, in DFCM's judgment, may be necessary to pay just claims against the Contractor or Subcontractor at any tier for labor and services rendered and materials furnished in and about the Work. The DFCM may apply such withheld amounts for the payment of such claims in DFCM's discretion. In so doing, the DFCM shall be deemed the agent of Contractor and payment so made by the DFCM shall be considered as payment made under this Contractor's Agreement by the DFCM to the Contractor. DFCM shall not be liable to the Contractor for any such payment made in good faith. Such withholdings and payments may be made without prior approval of the Contractor and may be also be prior to any determination as a result of any dispute, PRE, Claim or litigation.

ARTICLE 12. INDEMNIFICATION. The Contractor shall comply with the indemnification provisions of the General Conditions.

ARTICLE 13. SUCCESSORS AND ASSIGNMENT OF CONTRACT. The DFCM and Contractor, respectively bind themselves, their partners, successors, assigns and legal representatives to the other party to this Agreement, and to partners, successors, assigns and legal representatives of such other party with respect to all covenants, provisions, rights and responsibilities of this Contractor's Agreement. The Contractor shall not assign this Contractor's Agreement without the prior written consent of the DFCM, nor shall the Contractor assign any moneys due or to become due as well as any rights under this Contractor's Agreement, without prior written consent of the DFCM.

ARTICLE 14. RELATIONSHIP OF THE PARTIES. The Contractor accepts the relationship of trust and confidence established by this Contractor's Agreement and covenants with the DFCM to cooperate with the DFCM and A/E and use the Contractor's best skill, efforts and judgment in furthering the interest of the DFCM; to furnish efficient business administration and supervision; to make best efforts to furnish at all times an adequate supply of workers and materials; and to perform the Work in the best and most expeditious and economic manner consistent with the interests of the DFCM.

ARTICLE 15. AUTHORITY TO EXECUTE AND PERFORM AGREEMENT. Contractor and DFCM each represent that the execution of this Contractor's Agreement and the performance thereunder is within their respective duly authorized powers.

ARTICLE 16. ATTORNEY FEES AND COSTS. Except as otherwise provided in the dispute resolution provisions of the General Conditions, the prevailing party shall be entitled to reasonable attorney fees and costs incurred in any action in the District Court and/or appellate body to enforce this Contractor's Agreement or recover damages or any other action as a result of a breach thereof.

IN WITNESS WHEREOF, the parties hereto have executed this Contractor's Agreement on the day and year stated hereinabove.

CONTRACTOR: _____

_____
Signature Date

Title: _____

State of _____)
)
County of _____) _____
Please type/print name clearly

On this ____ day of _____, 20____, personally appeared before me, _____, whose identity is personally known to me (or proved to me on the basis of satisfactory evidence) and who by me duly sworn (or affirmed), did say that he (she) is the _____ (title or office) of the firm and that said document was signed by him (her) in behalf of said firm.

_____
Notary Public

(SEAL)

My Commission Expires _____

APPROVED AS TO AVAILABILITY OF FUNDS:

_____
David D. Williams, Jr. Date
DFCM Administrative Services Director

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

_____
Lynn A. Hinrichs Date
Assistant Director Construction Management

APPROVED AS TO FORM:
ATTORNEY GENERAL
May 5, 2008
By: Alan S. Bachman
Asst Attorney General

APPROVED FOR EXPENDITURE:

_____
Division of Finance Date

PERFORMANCE BOND

(Title 63, Chapter 56, U. C. A. 1953, as Amended)

That _____ hereinafter referred to as the "Principal" and _____, a corporation organized and existing under the laws of the State of _____, with its principal office in the City of _____ and authorized to transact business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah, hereinafter referred to as the "Obligee, " in the amount of _____ _____ DOLLARS ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____, for the approximate sum of _____ _____ Dollars ($_____), which Contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall faithfully perform the Contract in accordance with the Contract Documents including, but not limited to, the Plans, Specifications and conditions thereof, the one year performance warranty, and the terms of the Contract as said Contract may be subject to Modifications or changes, then this obligation shall be void; otherwise it shall remain in full force and effect.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the state named herein or the heirs, executors, administrators or successors of the Owner.

The parties agree that the dispute provisions provided in the Contract Documents apply and shall constitute the sole dispute procedures of the parties.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the Provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20_____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)

) ss.

COUNTY OF _____)

On this _____ day of _____, 20____, personally appeared before me _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney in-fact of the above-named Surety Company and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

PAYMENT BOND

(Title 63, Chapter 56, U. C. A. l953, as Amended)

KNOW ALL PERSONS BY THESE PRESENTS:

That _____ hereinafter referred to as the "Principal," and _____ _____, a corporation organized and existing under the laws of the State of _____authorized to do business in this State and U. S. Department of the Treasury Listed (Circular 570, Companies Holding Certificates of Authority as Acceptable Securities on Federal Bonds and as Acceptable Reinsuring Companies); with its principal office in the City of _____, hereinafter referred to as the "Surety," are held and firmly bound unto the State of Utah hereinafter referred to as the "Obligee," in the amount of _____ Dollars ($_____) for the payment whereof, the said Principal and Surety bind themselves and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written Contract with the Obligee, dated the _____ day of _____, 20____, to construct _____ in the County of _____, State of Utah, Project No. _____ for the approximate sum of _____ _____ Dollars ($_____), which contract is hereby incorporated by reference herein.

NOW, THEREFORE, the condition of this obligation is such that if the said Principal shall pay all claimants supplying labor or materials to Principal or Principal's Subcontractors in compliance with the provisions of Title 63, Chapter 56, of Utah Code Annotated, l953, as amended, and in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise it shall remain in full force and effect.

That said Surety to this Bond, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Contract or to the Work to be performed thereunder, or the specifications or drawings accompanying same shall in any way affect its obligation on this Bond, and does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to the Work or to the specifications or drawings and agrees that they shall become part of the Contract Documents.

PROVIDED, HOWEVER, that this Bond is executed pursuant to the provisions of Title 63, Chapter 56, Utah Code Annotated, 1953, as amended, and all liabilities on this Bond shall be determined in accordance with said provisions to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____ day of _____, 20____.

WITNESS OR ATTESTATION:

_____

PRINCIPAL:

_____

By: _____

(Seal)

Title: _____

WITNESS OR ATTESTATION:

_____

SURETY:

_____

By: _____

Attorney-in-Fact (Seal)

STATE OF _____)
) ss.
COUNTY OF _____)

On this _____ day of _____, 20_____, personally appeared before me _____ _____, whose identity is personally known to me or proved to me on the basis of satisfactory evidence, and who, being by me duly sworn, did say that he/she is the Attorney-in-fact of the above-named Surety Company, and that he/she is duly authorized to execute the same and has complied in all respects with the laws of Utah in reference to becoming sole surety upon bonds, undertakings and obligations, and that he/she acknowledged to me that as Attorney-in-fact executed the same.

Subscribed and sworn to before me this _____ day of _____, 20_____.

My commission expires: _____

Resides at: _____

_____

NOTARY PUBLIC

Agency: _____
Agent: _____
Address: _____
Phone: _____

Approved As To Form: May 25, 2005
By Alan S. Bachman, Asst Attorney General

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____ PROJECT NO: _____

AGENCY/INSTITUTION _____

AREA ACCEPTED _____

The Work performed under the subject Contract has been reviewed on this date and found to be Substantially Completed as defined in the General Conditions; including that the construction is sufficiently completed in accordance with the Contract Documents, as modified by any change orders agreed to by the parties, so that the State of Utah can occupy the Project or specified area of the Project for the use for which it is intended.

The DFCM - (Owner) accepts the Project or specified area of the Project as Substantially Complete and will assume full possession of the Project or specified area of the Project at _____ (time) on _____ (date).

The DFCM accepts the Project for occupancy and agrees to assume full responsibility for maintenance and operation, including utilities and insurance, of the Project subject to the itemized responsibilities and/or exceptions noted below:

_____

_____

The Owner acknowledges receipt of the following closeout and transition materials:

Record Drawings O & M Manuals Warranty Documents Completion of Training Requirements

A list of items to be completed or corrected (Punch List) is attached hereto. The failure to include an item on it does not alter the responsibility of the Contractor to complete all the Work in accordance with the Contract Documents, including authorized changes thereof. The amount of_____. (Twice the value of the punch list work) shall be retained to assure the completion of the punch list work.

The Contractor shall complete or correct the Work on the list of (Punch List) items appended hereto within _____ ____calendar days from the above date of issuance of this Certificate. If the list of items is not completed within the time allotted the Owner has the right to be compensated for the delays and/or complete the work with the help of independent contractor at the expense of the retained project funds. If the retained project funds are insufficient to cover the delay/completion damages, the Owner shall be promptly reimbursed for the balance of the funds needed to compensate the Owner.

_____ by: _____

CONTRACTOR (include name of firm) (Signature) DATE

_____ by: _____

A/E (include name of firm) (Signature) DATE

_____ by: _____

USING INSTITUTION OR AGENCY (Signature) DATE

_____ by: _____

DFCM (Owner) (Signature) DATE

4110 State Office Building, Salt Lake City, Utah 84114
telephone 801-538-3018 • facsimile 801-538-3267 • http://dfcm.utah.gov

cc: Parties Noted
DFCM, Director

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

Division of Facilities Construction and Management

DFCM

General Contractor Performance Rating Form

Project Name:		DFCM Project#	
Contractor: (ABC Construction, John Doe, 111-111-1111)	A/E: (ABC Architects, Jane Doe, 222-222-2222)	Original Contract Amount:	Final Contract Amount:
DFCM Project Manager:		Contract Date:	
Completion Date:		Date of Rating:	

Rating Guideline	QUALITY OF PRODUCT OR SERVICES	COST CONTROL	TIMELINESS OF PERFORMANCE	BUSINESS RELATIONS
5-Exceptional	Contractor has demonstrated an exceptional performance level in any of the above four categories that justifies adding a point to the score. Contractor performance clearly exceeds the performance levels described as "Very Good"			
4-Very Good	Contractor is in compliance with contract requirements and/or delivers quality product/service.	Contractor is effective in managing costs and submits current, accurate, and complete billings	Contractor is effective in meeting milestones and delivery schedule	Response to inquiries, technical/service/ administrative issues is effective
3-Satisfactory	Minor inefficiencies/errors have been identified	Contractor is usually effective in managing cost	Contractor is usually effective in meeting milestones and delivery schedules	Response to inquires technical/ service/administrative issues is somewhat effective
2-Marginal	Major problems have been encountered	Contractor is having major difficulty managing cost effectively	Contractor is having major difficulty meeting milestones and delivery schedule	Response to inquiries, technical/service/administrative issues is marginally effective
1-Unsatisfactory	Contractor is not in compliance and is jeopardizing achievement of contract objectives	Contractor is unable to manage costs effectively	Contractor delays are jeopardizing performance of contract objectives	Response to inquiries, technical/service/administrative issues is not effective

1. Rate Contractors quality of workmanship, management of sub contractor performance, project cleanliness, organization and safety requirement.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

2. Rate Contractor administration of project costs, change orders and financial management of the project budget.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

3. Rate Contractor's performance and adherence to Project Schedule, delay procedures and requirements of substantial completion, inspection and punch-list performance.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

4. Evaluate performance of contractor management team including project manager, engineer and superintendent also include in the rating team's ability to work well with owner, user agency and consultants.	**Score**
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

5. Rate success of Contractor's management plan, completion of the plans mitigation of project risks and performance of value engineering concepts.	Score
Agency Comments:	
A & E Comments:	
DFCM Project Manager Comments:	

Signed by:	Date:	Mean Score

Additional Comments:

DEPARTMENT OF SAFETY
RICHFIELD U.H.P - I.T.S. DISPATCH MODIFICATIONS

DFCM PROJECT # 06298550

State of Utah—Department of Administrative Services

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT

4110 State Office Building / Salt Lake City, Utah 84114 / 538-3018

SPECIFICATIONS

PREPARED BY

WHW ENGINEERING INC.
8619 SOUTH SANDY PARKWAY, SUITE 101
SANDY, UTAH 84070
PHONE: (801) 466-4021
FAX: (801) 466-8536

DECEMBER 2007

WHW Engineering Project # 06054

DIVISION 1 - GENERAL REQUIREMENTS (ARCHITECTURAL)

01010	SUMMARY OF WORK
01040	COORDINATION
01200	PROJECT MEETINGS
01300	SUBMITTALS
01400	QUALITY CONTROL
01500	CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
01700	CONTRACT CLOSEOUT

DIVISION 1 - GENERAL REQUIREMENTS (MECHANICAL)

01100	SUMMARY
01140	WORK RESTRICTIONS
01200	DEFINITIONS AND STANDARDS
01300	PROCEDURES AND CONTROLS
01330	SUBMITTAL PROCEDURES
01732	SELECTIVE DEMOLITION
01770	CLOSEOUT PROCEDURES
01781	PROJECT RECORD DOCUMENTS

DIVISION 2 - SITE CONSTRUCTION

02070	SELECTIVE DEMOLITION

DIVISION 6 - WOOD AND PLASTICS

06402	INTERIOR ARCHITECTURAL WOODWORK

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07920	JOINT SEALANTS

DIVISION 8 - DOORS AND WINDOWS

08110	STEEL DOORS AND FRAMES
08710	FINISH HARDWARE

DIVISION 9 - FINISHES

09255	GYPSUM BOARD

09511 ACOUSTICAL PANEL CEILINGS
09653 RESILIENT WALL BASE AND ACCESSORIES
09680 CARPET
09900 PAINTING

DIVISION 12 - BLINDS

12511 HORIZONTAL LOUVER BLINDS

DIVISION 15 - MECHANICAL

15010 GENERAL REQUIREMENTS
15050 BASIC MATERIALS & METHODS
15077 IDENTIFICATION FOR HVAC
15733 ROOFTOP REPLACEMENT-AIR UNITS
15815 METAL DUCTS
15820 DUCT ACCESSORIES
15855 DIFFUSERS, REGISTERS AND GRILLES
15900 HVAC AND INSTRUMENTATION CONTROLS
15950 TESTING, ADJUSTING AND BALANCING

DIVISION 16 - ELECTRICAL

16000 GENERAL PROVISIONS, ELECTRICAL
16060 MINOR ELECTRICAL DEMOLITION FOR REMODELING
16110 RACEWAYS
16120 CONDUCTORS
16130 ELECTRICAL BOXES
16140 OUTLETS AND WIRING DEVICES
16190 SUPPORTING DEVICES
16195 ELECTRICAL IDENTIFICATION
16400 SECONDARY SERVICE AND DISTRIBUTION
16450 SECONDARY GROUNDING
16470 PANEL BOARDS
16475 FUSES
16480 MOTOR STARTERS AND CONTROLS
16500 LIGHTING
16670 LIGHTING PROTECTION SYSTEM
16720 FIRE ALARM SYSTEM
16740 TELEPHONE/DATA SYSTEM

Department of Safty
Richfield U.H.P. , I.T.S. Dispatch Modifications
Division of Facilities Construction Management

SECTION 01010 - SUMMARY OF WORK
This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.
This Section, more than any other, is Project specific. Sample Section Text is contained in the Evaluations to illustrate possible Section content. Revise sample paragraphs carefully to reflect specific Project requirements, or delete them if they do not apply. See Evaluations for sample text and further discussion.
GENERAL
RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
WORK COVERED BY CONTRACT DOCUMENTS
This Article illustrates one method of summarizing the Work. Revise as necessary to describe the Project accurately.
In the following paragraphs, remove text enclosed in angle brackets < > and insert text appropriate for the Project. See Evaluations for sample paragraphs of Project descriptions.
Paragraph below identifies name and location of the Project and name of the Owner and the Architect.
The Project consists of an interior remodel to the existing U.H.P. – I.T.S. Dispatch facility located in Richfield, Utah as shown on the architectural drawings.

Project Location: U.H.P. – I.T.S. Dispatch – Richfield, Utah.
Owner: State of Utah
Contract Documents were prepared for the Project by:

P+A Architects
821 East Kensington Avenue
Salt Lake City, Utah 84105
Phone: 801.484.1161
Fax: 801.485.4640
E: parchitects@comcast.net

Insert paragraph identifying the Construction Manager for projects conducted using construction-management techniques.
Include an abbreviated Summary of Work for the Project described above in paragraphs below. Use language identical to that in the Agreement. See Evaluations for examples of typical projects.
The Work includes the interior remodel to the existing U.H.P. – I.T.S. Dispatch facility located in Richfield, Utah. Work will include an interior upgrade to the existing facilities mechanical systems, electrical upgrades, new lighting systems, new lay-in ceiling systems, fire sprinklers, gypsum board walls, hollow metal doors and frames, hollow metal window systems, painting, casework, metal lockers and carpet.

A. The contractor is responsible for the complete execution of the Contract Documents as indicated and specified. He is responsible for the work performed, the acts and omissions of his sub-contractors and suppliers and of persons either directly

or indirectly employed by them, as well as the work, acts and omissions of persons directly employed by him.

B. Provide, without additional charge, all incidental items required to complete the work even though not specifically indicated. Install all work so that its several component parts function together as a workable system, and in working order.
C. Conform to the highest quality standards for materials and workmanship as required to execute work indicated, specified and necessary to fully satisfy the Contract requirements for a complete, finished and acceptable installation.
D. The contractor is responsible to verify all field measurements of actual site conditions so that all work fits properly in the locations indicated and specified. Protect existing structures, improvements, landscaping, etc. from physical damage.
E. Upon completion of the project, dismantle and remove from the site all construction materials.
F. Any existing items which are damaged by the contractor shall be restored to their original or better condition to the satisfaction of the Owner.

CONTRACTOR USE OF PREMISES

This Article specifies requirements that govern the Contractor's use of the premises.

Retain paragraph below when the Project is on a vacant site or in an unoccupied building being renovated. Revise if necessary. If paragraph is retained, delete the remainder of the Article unless unusual Project requirements exist.

General: During the construction period the Contractor shall have full use of the exterior premises for construction operations, including use of the site as noted on site plan.

Delete above and retain below if the site will be accessible to other parties, or if some parts of a building being renovated will be occupied during construction. Revise to suit specific Project requirements. See Evaluations for discussion on limits on the Contractor's use of the site and sample text.

Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

Owner Occupancy: Allow for Owner occupancy and use by the public.

Subparagraph below contains an example of a special requirement appropriate to many projects. Change the requirement as necessary to suit Project conditions or delete if inappropriate.

Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

Insert additional paragraphs as appropriate, describing additional limitations on use of the site by construction personnel. See Evaluations for further discussion and additional sample paragraphs.

Retain requirements below when the Work involves an existing occupied building such as the one in the imaginary Project previously described. Delete otherwise.

Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

Insert additional paragraphs specifying specific limitations on a Contractor's use of an existing building. See Evaluations for further discussion and sample paragraphs describing restrictions that might be required when work is performed on an existing occupied building.

OCCUPANCY REQUIREMENTS

The Article below contains sample paragraphs describing occupancy of the Project during construction. It also describes partial occupancy before Substantial Completion. See Evaluations for discussion on occupancy during construction.

Retain paragraph below when the Owner will occupy the premises during construction. Modify as necessary.

Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.

Retain paragraph below when the Owner might occupy completed portions of the building prior to Substantial Completion. Modify to suit Project requirements.

Retain this Article only when the Project is subject to unusual general requirements that do not belong elsewhere but affect the entire Project. See Evaluations for further discussion and sample paragraphs depicting a typical situation. Delete the entire Article if no unusual requirements are required.

Insert paragraphs here as appropriate, detailing fully miscellaneous provisions. Develop paragraphs to satisfy specific Project requirements.

PRODUCTS (Not Applicable)

EXECUTION

Unless the Project includes provisions for products ordered in advance, indicate that Part 3 above, as well as Part 2, is not applicable.

SCHEDULE OF PRODUCTS ORDERED IN ADVANCE

If products ordered in advance are included in the Project, insert a schedule below. See Evaluations for information and a sample schedule.

END OF SECTION 01010

SECTION 01040 - COORDINATION
This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.
GENERAL
RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
SUMMARY warning
This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
Delete requirements not included from the list below. Insert special requirements, as necessary.

General project coordination procedures.
Conservation.
Coordination Drawings.
Administrative and supervisory personnel.
Cleaning and protection.
Related Sections: The following Sections contain requirements that relate to this Section:

Delete the 2 subparagraphs below if this Section includes field engineering or Project meetings. This Section often includes these subjects on small projects.
Division 1 Section "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
Revise the subparagraph below if the Project uses the Supplemental Section "Schedules and Reports" or a CPM-type Contractor's Construction Schedule.
Division 1 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
Division 1 Section "Materials and Equipment" for coordinating general installation.
Division 1 Section "Contract Closeout" for coordinating contract closeout.
COORDINATION
Requirements in the Article below amplify requirements in the General Conditions. Delete this Article if the General Conditions suit Project requirements and actions specified are not required.
Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
Make provisions to accommodate items scheduled for later installation.

Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.
Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
Insert other administrative activities needed to suit Project requirements.

Preparation of schedules.
Installation and removal of temporary facilities.
Delivery and processing of submittals.
Progress meetings.
Project closeout activities.
Conservation provisions below may be difficult to enforce. Penalties for wasteful practices, if necessary, are more enforceable if made a condition of the Contract and added by Supplementary Conditions. Insert specific conservation requirements in the appropriate Sections.
SUBMITTALS
Delete the requirement for Coordination Drawings below if installation is completely covered in a single Section or shown completely on Shop Drawings.
Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities.

Show the relationship of components shown on separate Shop Drawings.
Indicate required installation sequences.
Comply with requirements contained in Section "Submittals."
Staff Names: Within 15 days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
Insert special requirements for the superintendent and assistants that exceed requirements contained in General and Supplementary Conditions.
PRODUCTS (Not Applicable)
EXECUTION
GENERAL COORDINATION PROVISIONS
Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
CLEANING AND PROTECTION

Provisions in the next Article reduce or eliminate the need for similar provisions in other Sections. Insert provisions needed because of unusual Project conditions. Specify unusual provisions for specific work in the individual unit of work Section.
Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
Delete items from the list below that are not appropriate for the Project. Add items to suit Project requirements.

Excessive static or dynamic loading.
Excessive internal or external pressures.
Excessively high or low temperatures.
Thermal shock.
Excessively high or low humidity.
Air contamination or pollution.
Water or ice.
Solvents.
Chemicals.
Light.
Radiation.
Puncture.
Abrasion.
Heavy traffic.
Soiling, staining, and corrosion.
Bacteria.
Rodent and insect infestation.
Combustion.
Electrical current.
High-speed operation.
Unusual wear or other misuse.
Contact between incompatible materials.
Misalignment.
Excessive weathering.
Unprotected storage.
Improper shipping or handling.
Theft.
Vandalism.
END OF SECTION 01040

SECTION 01200 - PROJECT MEETINGS
This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.
GENERAL
RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
SUMMARY
This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
Delete meetings and conferences that are not required from the list below. Coordination meetings are only required if there are multiple prime contracts.

Preconstruction conferences.
Preinstallation conferences.
Progress meetings.
Coordination meetings.
If other meetings, such as Project closeout conferences, are required, insert meeting titles here and add requirements to the end of the Section.
Related Sections: The following Sections contain requirements that relate to this Section:

Division 1 Section "Coordination" for procedures for coordinating project meetings with other construction activities.
Revise the subparagraph below if requirements governing construction-schedule submittal are specified in special Supplemental Section "Schedules and Reports."
Division 1 Section "Submittals" for submitting the Contractor's Construction Schedule.
The subparagraph below refers to one building trade that frequently requires preinstallation conferences. Change the Section name as necessary to suit Project requirements. Add references to other Sections that also require preinstallation conferences. See Evaluations for further discussion.
Division 7 Section "TPO Roofing" for preinstallation roofing conferences.
PRECONSTRUCTION CONFERENCE
Adjust the number of days in the next paragraph to suit Project requirements.
Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect, but no later than 15 days after execution of the Agreement. Hold the conference at the Project Site. Conduct the meeting to review responsibilities and personnel assignments.
Amplify the paragraph below as necessary to suit Project requirements.
Attendees: Authorized representatives of the Owner, Architect, Engineer the Contractor and its superintendent; major subcontractors; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
Agenda: Discuss items of significance that could affect progress, including the following:
Add items for discussion as necessary to suit Project requirements.

Tentative construction schedule.
Critical work sequencing.
Designation of responsible personnel.
Procedures for processing field decisions and Change Orders.
Procedures for processing interpretation and modifications.
Procedures for processing Applications for Payment.
Distribution of Contract Documents.
Submittal of Shop Drawings, Product Data, and Samples, Quality Assurance/Control Submittals.
Preparation of record documents and O & M manuals.
Use of the premises.
Parking availability.
Office, work, and storage areas.
Equipment deliveries and priorities.
Safety procedures.
First aid.
Security.
Housekeeping.
Working hours.
Resolving current problems
Further orientation as to requirements of contract documents
Engineer’s responsibility to owner for inspection.
Working out general schedule of Engineer's inspection.

D. Engineer will record significant discussions and agreements and disagreements of each meeting and distribute minutes of meeting to everyone concerned, including Owner, within three working days.

PREINSTALLATION CONFERENCES
Delete this Article if the Project does not need preinstallation conferences. Limit preinstallation conferences to major assemblies where the Work requires tight control and coordination. If they are necessary, individual Specification Sections should specify preinstallation conferences as a requirement, and reference this Section.
Conduct a preinstallation conference at the Project Site before work begins to discuss roofing, roofing insulation, masonry, roof drainage installation.
Attendees: The Installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Architect of scheduled meeting dates.

Review the progress of other construction activities and preparations for the particular activity under consideration at preinstallation conference, including requirements for the following: Delete unnecessary items from the list below. Add items as necessary to suit Project requirements.

Contract Documents.
Options.

Related Change Orders.
Purchases.
Deliveries.
Shop Drawings, Product Data, and quality-control samples.
Possible conflicts.
Compatibility problems.
Time schedules.
Weather limitations.
Manufacturer's recommendations.
Warranty requirements.
Compatibility of materials.
Acceptability of substrates.
Temporary facilities.
Space and access limitations.
Governing regulations.
Safety.
Inspecting and testing requirements.
Required performance results.
Recording requirements.
Protection.

Record significant discussions and agreements and disagreements of each conference, and the approved schedule. Promptly distribute the record of the meeting to everyone concerned, including the Owner and the Architect.
Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
PROGRESS MEETINGS
Modify the paragraph below if the Project requires progress meetings on a monthly or weekly basis.
Progress meetings at the Project Site will be conducted at weekly intervals. The Architect and owner will notify general contractor of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.
Modify the paragraph below if attendance by other known entities is necessary.
Attendees: In addition to representatives of the Owner and Architect, Engineer, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
Revise the paragraph below to suit Project requirements.
Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.

Contractor's Construction Schedule: Review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
Review the present and future needs of each entity present, including the following:
Adjust the list below as necessary to suit Project requirements.

Interface requirements.
Time.
Sequences.
Status of submittals.
Deliveries.
Off-site fabrication problems.
Access.
Site utilization.
Temporary facilities and services.
Hours of work.
Hazards and risks.
Housekeeping.
Quality and work standards.
Modifications
Change Orders.
Documentation of information for payment requests.
Reporting: The Architect shall distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting, including owner
Usually delete the next Article. Coordination meetings are not required for work under single prime contracts. Retain when the Project is constructed under multiple prime contracts or if some unusual Project circumstance requires tighter control than normal. Under multiple prime contracts, the Owner often assigns responsibility for scheduling and conducting these meetings to the Contractor for General Construction.
COORDINATION MEETINGS
Delete this entire Article if the Project is being constructed under a single prime contract and coordination meetings are not required.
Modify the paragraph below if the Project requires coordination meetings on a monthly or weekly basis.
The contractor shall conduct project coordination meetings at required intervals convenient for all parties involved. Project coordination meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special preinstallation meetings.

Engineer will include brief summary, in narrative form, of progress since previous meeting. By three days after each progress meeting date, Engineer will distribute copies of minutes of meeting to each party present and to parties who should have been present, including Owner.
Request representation at each meeting by every party currently involved in coordination or planning for the construction activities involved.
Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
If other meetings, such as Project closeout conferences, are required, insert new articles specifying meeting requirements below.
PRODUCTS (Not Applicable)
EXECUTION (Not Applicable)
END OF SECTION 01200

SECTION 01300 - SUBMITTALS

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

Revise list below to include other required Submittals.
Daily construction reports.
Shop Drawings.
Product Data.
Samples.
Quality assurance submittals.
Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
List below includes administrative Submittals included elsewhere in Contract Documents. Modify items if necessary.

Permits.
Applications for Payment.
Performance and payment bonds.
Insurance certificates.
List of subcontractors.
Related Sections: The following Sections contain requirements that relate to this Section:
Subparagraphs below include Submittals usually specified in other Sections. Revise to suit Project.

Division 1 Section "Applications for Payment" specifies requirements for submittal of the Schedule of Values.
Revise subparagraph below to suit Project if submittal of Coordination Drawings is included under this Section.
Division 1 Section "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
Division 1 Section "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
Delete subparagraph below if submittal of construction photographs is not required.
Division 1 Section "Quality Control" specifies requirements for submittal of inspection and test reports.

Division 1 Section "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.
DEFINITIONS
Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.

Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
Delete paragraph below if Project does not require mockups. Coordinate with Division 1 Section "Quality Control."
Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.
SUBMITTAL PROCEDURES
Coordinate requirements in this Article with "Submittal Schedule" Article. Revise requirements to suit Project. If a submittal review sequence policy governs, revise this Article to comply with requirements. See discussion in Evaluations on submittal review sequence policies.
Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
Retain subparagraph below where one submittal has an impact on another.
Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
Revise subparagraph below to suit Project. Delete if General Conditions are adequate.

Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
Modify processing time to suit Project.

Allow 2 weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
If an intermediate submittal is necessary, process the same as the initial submittal.
Allow 2 weeks for reprocessing each submittal.
No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
Submittal Preparation: Place a permanent label or title block on each submittal for identification.
Indicate the name of the entity that prepared each submittal on the label or title block.

If desired, revise the size of the space indicated below.

Provide a space approximately 4 by 5 inches on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
Include the following information on the label for processing and recording action taken.
Modify list below to suit Project.

Project name.
Date.
Name and address of the Architect.
Name and address of the Contractor.
Name and address of the subcontractor.
Name and address of the supplier.
Name of the manufacturer.
Number and title of appropriate Specification Section.
Drawing number and detail references, as appropriate.
Expand or otherwise modify paragraph below to suit Project.
Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. The Architect will not accept submittals received from sources other than the Contractor.
Retain subparagraph below with any of the optional transmittal forms below.

On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
If transmittal forms used by contractors are acceptable, delete both options below. Otherwise, retain 1 of 2 forms below.
Transmittal Form: Use AIA Document G810.
CONTRACTOR'S CONSTRUCTION SCHEDULE
Complicated projects usually begin with a preliminary schedule as described in Division 1 Supplemental Section "Schedules and Reports." Insert one here if necessary.
The bar-chart schedule below is adequate for most projects, including multiple prime contracts.
If Project requires a CPM schedule, delete this Article; either specify Contractor's Construction Schedule in a separate Supplemental Section or transfer procedures from that Section to this Section.
Revise the 30-day time period below if necessary to suit Project.
Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 5 days after the date established for "Commencement of the Work."

Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values."
Revise percentage increments and time requirements below to suit Project.

Within each time bar, indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.
Prepare the schedule on a sheet, or series of sheets, of stable transparency, or other reproducible media, of sufficient width to show data for the entire construction period.
Secure time commitments for performing critical elements of the Work from parties involved.
Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
Indicate completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.
Delete paragraph below if phasing is not applicable. Amplify if necessary to suit Project.
Retain paragraph below for large or complicated small projects. Consider limiting it to critical work.
Work Stages: Indicate important stages of construction for each major portion of the Work, including submittal review, testing, and installation.
List critical work here if requirement to indicate stages of work is limited.
Retain paragraph below for high-rise buildings, multiple-building projects, and complex structures. Delete for small projects, and large single-story and single-volume projects.
Distribution: Following response to the initial submittal, print and distribute copies to the Architect, Owner, subcontractors, and other parties required to comply with scheduled dates.
Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.
If Project requires additional schedules, see Division 1 Supplemental Section "Schedules and Reports."
DAILY CONSTRUCTION REPORTS
Modify paragraph below if Project requires reports more or less frequently.
Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Architect at weekly intervals:
Delete items below that are not applicable. Insert others as required.

List of subcontractors at the site.
High and low temperatures, general weather conditions.
Accidents and unusual events.
Meetings and significant decisions.
Stoppages, delays, shortages, and losses.
Emergency procedures.
Orders and requests of governing authorities.
Change Orders received, implemented.
Services connected, disconnected.
Equipment or system tests and startups.
Partial Completions, occupancies.
Substantial Completions authorized.
Other reports may be needed. See Evaluations for further discussion.

SHOP DRAWINGS
Modify below to suit each Project. Comply with Owner's requirements and office policy.
Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
Amplify list below as necessary to suit Project.

Dimensions.
Identification of products and materials included by sheet and detail number.
Compliance with specified standards.
Notation of coordination requirements.
Notation of dimensions established by field measurement.
Modify subparagraph below to establish a standard sheet size and format.
Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48.
Consider omitting the requirement for an initial submittal of Shop Drawings below.
Usually retain subparagraph above and delete subparagraph below. Retain below only for small projects.
Retain subparagraph below when initial submittal is a reproducible print.
Final Submittal: Submit 5 blue- or black-line prints where required for maintenance manuals. The Architect will retain 2 prints and return the remainder.
Do not use Shop Drawings without an appropriate final stamp indicating action taken.
PRODUCT DATA
Modify below to suit each Project. Comply with Owner's requirements and office policy.
Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.

Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
Include the following information as applicable. Amplify list below as necessary to suit Project.

Manufacturer's printed recommendations.
Compliance with trade association standards.
Compliance with recognized testing agency standards.
Application of testing agency labels and seals.
Notation of dimensions verified by field measurement.
Notation of coordination requirements.

Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

Retain subparagraph below unless this procedure is not permitted.
Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
Revise subparagraph below if Project requires a method of handling similar to that for Shop Drawings.
Submittals: Submit 4 copies of each required submittal; submit 4 copies where required for maintenance manuals. The Architect will retain one and will return one to the owner and two to the general contractor marked with action taken and corrections or modifications required.

Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.

Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.

Do not proceed with installation until a copy of Product Data is in the Installer's possession.
Do not permit use of unmarked copies of Product Data in connection with construction.
SAMPLES
Modify below to suit each Project. Comply with Owner's requirements and office policy.
Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.

Mount or display Samples in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
Amplify list below as necessary to suit Project.

Specification Section number and reference.
Generic description of the Sample.
Sample source.
Product name or name of the manufacturer.
Compliance with recognized standards.
Availability and delivery time.

Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least 3 multiple units that show approximate limits of the variations.
Retain subparagraph below if Samples illustrate the assembly of different components that comprise a single unit. See Evaluations for further discussion.

Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
Delete subparagraph below if Samples are not returned for incorporation in work.
Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
Revise subparagraph below if Project requires a different procedure. Consider indicating preliminary Submittals as a separate item in the Submittal Schedule.

Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices.

The Architect will review and return preliminary submittals with the Architect's notation, indicating selection and other action.
Consider changing the number of sets in subparagraph below to 1 or 2, or modify to comply with Owner's requirements.

Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit 3 sets. The Architect will return one set marked with the action taken.
Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.

Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
Sample sets may be used to obtain final acceptance of the construction associated with each set.
Retain paragraph below even if another set is retained and sent to the field office by Architect for that purpose.
Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
If field Samples are not required, delete subparagraph below. Field Samples may include painted surfaces, floor patterns, integrated ceilings, masonry, and similar items. Review Sections in Divisions 2 through 16 carefully before deleting.

Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.

Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.
QUALITY ASSURANCE SUBMITTALS
Modify below to suit each Project. Comply with Owner's requirements and office policy.

Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
Revise paragraph below to comply with specific Project requirements.
Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
Revise paragraph below if submittal of test reports is included in this Section.
Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."
ARCHITECT'S ACTION
Article 4.2.7 of AIA Document A201 states "the Architect Will Review and Approve or Take Other Appropriate Action upon the Contractor's Submittals..." To comply with language in AIA Document A201, this Section uses the word "approved" in this Article. Upon advice of legal counsel, modify the Article by changing the word to milder phrase. See Evaluations for further discussion.
Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.

Compliance with specified characteristics is the Contractor's responsibility.
Requirements below illustrate the policy followed by many offices. Revise to reflect Project requirements.
Many architectural offices use a stamp to indicate the action taken. Retain paragraph below when using an action stamp, or substitute another system.
Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.
PRODUCTS (Not Applicable)
EXECUTION (Not Applicable)
END OF SECTION 01300

SECTION 01400 - QUALITY CONTROL

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.
Adjustments to the Text of this Section will be necessary in the case of multiple prime contracts.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes administrative and procedural requirements for quality-control services.
Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
Retain paragraph below to clarify the applicability of provisions in this Section. Modify to suit Project. Coordinate modifications with General Conditions and other Division 1 Sections. See AIA Document A201, Paragraphs 3.3.3, 13.5.1, and 13.5.2.
Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.

Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
Related Sections: The following Sections contain requirements that relate to this Section:

Division 1 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
Retain subparagraph below if Project requires schedule of tests and inspections. Revise below if Division 1 Supplemental Section "Schedules and Reports" is used.
Division 1 Section "Submittals" specifies requirements for development of a schedule of required tests and inspections.

RESPONSIBILITIES

Retain paragraph below for normal projects where Contractor is responsible for providing quality-control services. Revise for multiple prime contracts. See Evaluations for further discussion.
Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.

Retain subparagraph below when some Sections require an independent testing agency to perform certain tests and inspections.

Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
Retain subparagraph below when some Sections designate the Owner as responsible for certain tests and inspections.
Retain paragraph below (it is not covered in the General Conditions) and insert special Project requirements. Additional requirements might include the Architect's right to require use of a different laboratory for retesting.
Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
SUBMITTALS
Retain paragraph below. Revise to suit Project. In the case of multiple prime contracts, consider assigning responsibility for coordination of Submittals to Contractor for General Construction. See Evaluations for further discussion.
Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Architect. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.

Submit additional copies of each written report directly to the governing authority, when the authority so directs.
Revise or expand subparagraph below as required to suit Project.
Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:

Date of issue.
Project title and number.
Name, address, and telephone number of testing agency.
Dates and locations of samples and tests or inspections.
Names of individuals making the inspection or test.
Designation of the Work and test method.
Identification of product and Specification Section.
Complete inspection or test data.
Test results and an interpretation of test results.
Ambient conditions at the time of sample taking and testing.
Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.

Name and signature of laboratory inspector.
Recommendations on retesting.
PRODUCTS (Not Applicable)
If Owner identifies specific testing agencies to perform designated tests and inspections, delete "(Not Applicable)" above and insert paragraphs identifying the independent agencies here.
EXECUTION
REPAIR AND PROTECTION
General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
In the case of multiple prime contracts, consider assigning responsibility for protection to Contractor for General Construction. See Evaluations for further discussion.
Protect construction exposed by or for quality-control service activities, and protect repaired construction.
Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.
END OF SECTION 01400

Department of Safety
Richfield U.H.P. - I.T.S. Dispatch Modifications
Division of Facilities Construction Management

SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.
GENERAL
RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
SUMMARY
This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
Temporary utilities include, but are not limited to, the following:
Modify list below to suit Project.

Water service and distribution.
Temporary electric power and light.
Temporary heat.
Ventilation.
Sanitary facilities, including drinking water.
Storm and sanitary sewer.
Support facilities include, but are not limited to, the following:
Modify list below to suit Project.

Storage sheds.
Dewatering facilities and drains.
Temporary project identification signs and bulletin boards.
Waste disposal services.
Security and protection facilities include, but are not limited to, the following:
Modify list below to suit Project.

Temporary fire protection.
Barricades, warning signs, and lights.
Enclosure fencing.
SUBMITTALS
Include requirements for submittal of installation Drawings of critical temporary utilities, if required.
Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
Delete the requirement below on projects of short duration and on small projects with few temporary utility requirements.
QUALITY ASSURANCE
Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
Modify list below to comply with local regulations. Include requirements governing storm drainage, disposal of excess excavation and waste material, and similar regulations.

Building code requirements.
Health and safety regulations.
Utility company regulations.
Police, fire department, and rescue squad rules.
Environmental protection regulations.
If Owner has made environmental impact commitments, attach copies or indicate where they may be examined.
Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.
PROJECT CONDITIONS
Revise below to minimize temporary use of permanent utilities, or insert exceptions to provisions. Discourage attempts to delay activation of standpipes and sprinklers.
Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.
Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.
PRODUCTS
MATERIALS
Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
Water: Provide potable water approved by local health authorities.
EQUIPMENT
General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
Delete equipment that is not required. Add equipment as necessary to suit Project.
Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.
Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
Modify paragraph below to suit Project.
Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
Modify paragraph below to add stricter requirements when conditions warrant.
Delete paragraph below when fixtures connected to previously installed water and sewer service must be used.
Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
EXECUTION
INSTALLATION
Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
TEMPORARY UTILITY INSTALLATION
General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
Retain subparagraph below to prevent extra cost to Owner.
Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Architect. Neither the Owner nor Architect will accept cost or use charges as a basis of claims for Change Orders.
Add provisions for work not in Contract but served by temporary facilities, if required.

Amplify paragraph below by adding provisions, such as pumping, if necessary to suit Project. See Evaluations for further discussion and sample text.
Modify paragraph and subparagraphs below to include special power loads, such as continued operation of the existing facility, while power changeover is being made.
Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
Modify subparagraph below to suit Project if underground service must be provided.

Install electric power service underground, except where overhead service must be used.
Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
Insert additional provisions for power distribution to suit Project. See Evaluations for further discussion and sample text.
Temporary Lighting: When overhead floor or roof deck has been installed, provide temporary lighting with local switching.
Insert additional lighting provisions to suit Project. See Evaluations for further discussion and sample text.

Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.
Paragraph below includes typical requirements. Delete in the South and Southwest where low winter temperatures are uncommon.
Temporary Heat: Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
Modify paragraph below as necessary. LP-gas or fuel-oil heaters are commonly used. Steam or hot-water heaters, gas-fired space heaters, or electric unit heaters are also often used.
Revise below to suit Project.
Paragraph below provides for normal disposal of liquid wastes.
Sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material.
Delete paragraph below when facilities are not available or use is not permitted even if available. Retain paragraph below unless facilities can be connected to local water and sewer lines.

Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted.
Retain subparagraph below with either of the 2 paragraphs above on all but the smallest projects. Paragraph below may be excessive for small- and medium-size projects.
Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a healthy and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.
Retain subparagraph below where required by authorities or recommended for health and safety reasons.
Retain paragraph above where potable water is accessible from permanent or temporary lines. Where potable water is not available, retain paragraph below.
Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled-water drinking-water units, including paper supply.
Usually retain subparagraph below.
If Project requires food and beverage service facilities, insert provisions here. Add janitorial services if required. See Evaluations for further discussion and sample text.
Insert gas or other utility services and ventilation or humidity control as required.
SUPPORT FACILITIES INSTALLATION
If contractor chooses to use storage sheds, locate storage sheds, and other temporary construction and support facilities for easy access and within fenced area shown on construction documents.

Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.
Review paragraph below with Owner's insurance carrier. Modify as necessary to suit Project.
Insert additional paragraphs to include other equipment, such as fax machines, copying machines, and computers.
Expand paragraph below to suit Project.
Storage and Fabrication Sheds: (If Required) Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
Delete paragraph below for most urban sites. Permanent paving is assumed to be asphalt concrete. Revise if permanent paving is concrete.
Retain paragraph below. Temporary enclosures are required on most projects at some time during construction. Modify as necessary to suit Project.
Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
Delete paragraph below for low-rise construction of less than 3 stories.
Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
Paragraph below is the simplest method of specifying temporary elevator usage. If provisions must be contained in this Section, transfer provisions from Division 14 Sections for elevators and cross-reference this Section.

Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

Revise subparagraph below to suit Project.
Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.
If required, insert a list of required signs.
Revise paragraph below as desired. Insert specific requirements, such as parking lot lighting and illumination of Project identification sign.
Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
Add references to approved disposal methods. Cross-reference Sections that specify handling of special waste material. See Evaluations for further discussion and sample text.
Delete paragraph below only when cost considerations are paramount. Expand if specific pests, such as termites or pigeons, are known to be a problem.
Individual Project circumstances may require use of other construction aids and miscellaneous facilities, such as walkways, scaffoldings, platforms, swing stages, ramps and bridges, incidental sheeting and shoring, demolition waste chutes, and similar construction aids. Add requirements as necessary to suit Project.
SECURITY AND PROTECTION FACILITIES INSTALLATION
Modify paragraph below if it does not represent desired arrangement.
Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Architect.
Paragraph below specifies currently accepted requirements. Modify to suit local conditions. See Evaluations for further discussion and sample text.
Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

Locate fire extinguishers where convenient and effective for their intended purpose.
Store combustible materials in containers in fire-safe locations.
Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

When sprinkler systems or other permanent fire-protection systems are used, add specific requirements.
Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
Delete paragraph below for restricted city and urban sites where a combination fence and covered walkway or sidewalk bridge will be used.
Enclosure Fence: Install an enclosure fence with lockable entrance gates. Locate where indicated, determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.

Provide open-mesh, chainlink fencing with posts set in a compacted mixture of gravel and earth.
Retain subparagraph above when chainlink fencing is acceptable. Retain subparagraph below when a solid, framed wood fence is required.
Delete paragraph below where covered walkways are not required and there is sufficient area to conduct operations including delivery. Include installation details on Drawings.
Retain paragraph below because the enclosure fence does not always provide adequate security against theft and vandalism.
Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.
Insert local code references on this subject. Consider indicating hours when noise-making activities are prohibited.
OPERATION, TERMINATION, AND REMOVAL
Paragraph below is important where allowances for metered use of temporary facilities have been established.
Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility.

Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
Consider inserting specific removal requirements, as illustrated below.
Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, landscaping and sidewalks at the temporary entrances, as required by the governing authority.
At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:

Check subparagraphs below for conflict or duplication with provisions in other Sections, particularly Divisions 15 and 16.
Replace significantly worn parts and parts subject to unusual operating conditions.
Review final draft of this Section with Owner. Advise Owner how any exceptions to its provisions might translate into costs borne by Owner.
END OF SECTION 01500

SECTION 01700 - CONTRACT CLOSEOUT

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:

Inspection procedures.
Project record document submittal.
Operation and maintenance manual submittal.
Submittal of warranties.
Final cleaning.

Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions 2 through 16.

FINAL ACCEPTANCE

Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

Revise subparagraphs below to match the Supplementary Conditions.

Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.

Submit an updated final statement, accounting for final additional changes to the Contract Sum.

Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.

Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.

Submit consent of surety to final payment.

Submit a final liquidated damages settlement statement.

Submit evidence of final, continuing insurance coverage complying with insurance requirements.

Modify paragraph below to comply with office policy and Project requirements.

Reinspection Procedure: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Architect.

Upon completion of reinspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
If necessary, reinspection will be repeated.
Delete the next Article if Project uses Division 1 Supplemental Section "Project Record Documents."
RECORD DOCUMENT SUBMITTALS
Article 3.11 of AIA Document A201 includes general provisions for record documents. Paragraphs in this Article expand on those requirements.
General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.
Use Division 1 Supplemental Section "Product Record Documents" when special procedures, such as corrected, reproducible copies of Contract Drawings, are required.
Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
Note related change-order numbers where applicable.
Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
Consider deleting paragraph below on small projects.
Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
Note related record drawing information and Product Data.
Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.
Consider deleting paragraph below on small projects. If Change-Order proposals include resubmittal of updated Product Data, the need to mark up the previous submittal is eliminated.
Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.
Paragraph below represents the normal disposition of Samples.
Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.
Paragraph below contains requirements for handling miscellaneous record Submittals, such as foundation depths, special measurements, tests, surveys, mix records, and inspections by government authorities. If more detailed requirements are necessary, add a summary of miscellaneous record Submittals.
Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work.
Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.
Paragraph below contains minimum requirements. Delete when using Division 1 Supplemental Section "Operation and Maintenance Data."
Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

Emergency instructions.
Spare parts list.
Copies of warranties.
Recommended "turn-around" cycles.
Inspection procedures.
Shop Drawings and Product Data.
PRODUCTS (Not Applicable)
EXECUTION
CLOSEOUT PROCEDURES
Retain paragraph below unless Project uses Division 1 Supplemental Section "Operation and Maintenance Data."
Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
Modify list below to suit Project.

Maintenance manuals.
Record documents.
Spare parts and materials.
Tools.
Identification systems.
Hazards.
Cleaning.
Warranties and bonds.
Maintenance agreements and similar continuing commitments.
FINAL CLEANING
Delete this Article when using Division 1 Supplemental Section "Final Cleaning" or if owners prefer to use their own forces. Cleaning provisions in the General Conditions are limited to rubbish removal and similar activities.
General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 1 Section "Construction Facilities and Temporary Controls."
Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
If final cleaning is delayed until final acceptance, modify subparagraph below.

Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.
Below is a sample list of final-cleaning requirements. Modify to suit Project. If list is extensive, use Division 1 Supplemental Section "Final Cleaning."

Remove labels that are not permanent labels.
Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
Wipe surfaces of mechanical and electrical equipment.
Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.
First two paragraphs below represent the end of work specified in Division 1 Section "Construction Facilities and Temporary Controls." Most projects require these actions at completion of construction. Insert a paragraph on termite inspection where required by local code or desired for Project.
Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

Consider adding an article on continuing inspections or consultations by the Contractor. Possibly insert a schedule of approximate times for inspections.
END OF SECTION 01700

DIVISION 2
SITE CONSTRUCTION

SECTION 02070 - SELECTIVE DEMOLITION

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes the following:

Adjust list below to suit Project.

Demolition and removal of selected elements of a building.

Patching and repairs.

Related Sections: The following Sections contain requirements that relate to this Section:

List below only products, construction, and equipment for this Project that the reader might expect to find in this Section but are specified elsewhere. Verify that the Section titles listed below for this Project's Specifications are correct.

Division 1 Section "Summary of Work" for use of the building and phasing requirements.

Division 1 Section "Cutting and Patching" for cutting and patching procedures for selective demolition operations.

Division 1 Section "Schedules and Reports" for selective demolition schedule requirements.

Division 1 Section "Construction Facilities and Temporary Controls" for temporary utilities, temporary construction and support facilities, temporary security and protection facilities, and environmental protection measures for selective demolition operations.

Division 1 Section "Contract Closeout" for record document requirements.

If alternates, allowances, or unit prices apply to work of this Section, insert brief paragraphs here to alert the Contractor and reference the appropriate Division 1 Section for specific details.

DEFINITIONS

Add other paragraphs for terms that would benefit from definition. Revise definitions when required.

Remove: Remove and legally dispose of items except those indicated to be reinstalled, salvaged, or to remain the Owner's property.

When salvage is required, indicate or describe Owner's designated storage area, on-site or off-site.

Remove and Reinstall: Remove items indicated; clean, service, and otherwise prepare them for reuse; store and protect against damage. Reinstall items in the same locations.

Existing to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the Architect, items may be removed to a suitable, protected storage location during selective demolition and then cleaned and reinstalled in their original locations.

MATERIALS OWNERSHIP

Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the Owner's property, demolished materials shall become the Contractor's property and shall be removed from the site with further disposition at the Contractor's option.
SUBMITTALS
General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections, for information only, unless otherwise indicated.
Proposed dust-control measures.
Proposed noise-control measures.
One use of the schedule below is to track Contractor's progress. Another use is to determine that selective demolition will not interfere with Owner's operations. Delete schedule submittal if not required or if selective demolition will not interfere with Owner's operations.
Schedule of selective demolition activities indicating the following:

Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
Interruption of utility services.
Coordination for shutoff, capping, and continuation of utility services.
Delete both subparagraphs below when selective demolition will not interfere with Owner's operations.
Detailed sequence of selective demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
Coordination of Owner's continuing occupancy of existing building and of Owner's partial occupancy of completed Work.
Revise below to suit Project.
Retain record submittal below if applicable. Landfill records may be required by Owner when discarded demolished materials contain hazardous wastes.
Landfill records indicating receipt and acceptance of wastes by a landfill facility licensed to accept wastes.
QUALITY ASSURANCE
Demolition Firm Qualifications: Engage an experienced firm that has successfully completed selective demolition Work similar to that indicated for this Project.
Regulatory Requirements: Comply with governing EPA notification regulations before starting selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
Delete below if work of this Section is not extensive or complex enough to justify a conference.
PROJECT CONDITIONS
Retain, revise, or delete below as required. Add other limitations on Contractor if necessary, such as when floors above or below will be occupied.
Conduct demolition so that Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
Owner assumes no responsibility for actual condition of buildings to be selectively demolished.
Review below and revise if necessary. Include list of items that will be removed by Owner.

Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

Retain 1 of 2 paragraphs and subparagraphs below, or remove all references to asbestos. Expand scope of Article to include PCB's or other materials if required. Coordinate statements with the General and Supplementary Conditions.
Asbestos: Asbestos should not be encountered in the Work. If any materials suspected of containing asbestos are encountered, do not disturb the materials. Immediately notify the Architect and the Owner.
Storage or sale of removed items or materials on-site will not be permitted.
SCHEDULING
Add phasing requirements below if applicable. Delete paragraph below when selective demolition will not interfere with Owner's operations.
Arrange selective demolition schedule so as not to interfere with Owner's on-site operations.
WARRANTY
Retain this Article when existing special warranties apply, such as for roofing systems.
Existing Special Warranty: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.
PRODUCTS (Not Applicable)
Delete "(Not Applicable)" above when products are specified in this Section. Place requirements here.
REPAIR MATERIALS
Use repair materials identical to existing materials.

Where identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
Use materials whose installed performance equals or surpasses that of existing materials.
Insert specific material requirements here if they are not specified elsewhere. Material and installation requirements are better specified in individual Sections.
EXECUTION
EXAMINATION
Verify that utilities have been disconnected and capped.
Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
Inventory and record the condition of items to be removed and reinstalled
When unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict.
Promptly submit a written report to the Architect.
Usually retain paragraph below. OSHA regulations require an engineering survey before starting demolition operations.
Survey the condition of the building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of the structure or adjacent structures during selective demolition.
Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.
UTILITY SERVICES

Maintain existing utilities to remain in service and protect them against damage during selective demolition operations.
Retain subparagraph below if required. Limit hours of interruption if applicable.
Revise notice time in subparagraph below to suit Project.

Provide not less than 72 hours' notice to Owner if shutdown of service is required during changeover.
Retain 1 of 2 "Utility Requirements" paragraphs below if applicable. Delete both when Owner arranges and performs this work.
PREPARATION
Retain paragraph below when dangerous materials are known or suspected to have been used in pipes, tanks, or other equipment on the property. This paragraph excludes asbestos materials and other hazardous substances, such as PCB's or toxic wastes.
Delete paragraph below if not required.
Conduct demolition operations and remove debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
Revise above and below to suit Project. Delete both if adequately covered in Division 1 Sections.
Conduct demolition operations to prevent injury to people and damage to adjacent buildings and facilities to remain. Ensure safe passage of people around selective demolition area.

Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
Protect existing site improvements, appurtenances, and landscaping to remain.
Provide weather protection, during interval between demolition and removal of existing construction, on exterior surfaces and new construction to ensure that no water leakage or damage occurs to structure or interior areas.
Protect walls, ceilings, floors, and other existing finish work that are to remain and are exposed during selective demolition operations.
Retain or revise below if required. Coordinate below with Division 1 Section "Construction Facilities and Temporary Controls."
POLLUTION CONTROLS
Revise methods in paragraph below to suit Project. Water mist may not be acceptable.
Use water mist, temporary enclosures, and other suitable methods to limit the spread of dust and dirt. Comply with governing environmental protection regulations.

Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level.
Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before start of selective demolition.
SELECTIVE DEMOLITION
Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete Work within limitations of governing regulations and as follows:
Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. To minimize disturbance of adjacent surfaces, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
Do not use cutting torches
Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
Locate selective demolition equipment throughout the structure and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
Dispose of demolished items and materials promptly. On-site storage or sale of removed items is prohibited.
Return elements of construction and surfaces to remain to condition existing before start of selective demolition operations.
Paragraphs below are examples only. Add to, delete, or revise to suit Project.
Revise paragraph below to suit Project.
Revise paragraph below to suit Project. Replace generic Section title with actual type of roof membrane, such as "Built-up Asphalt Roofing."
Remove no more existing roofing than can be covered in one day by new roofing. See applicable Division 7 Section for new roofing requirements.
PATCHING AND REPAIRS
Promptly patch and repair holes and damaged surfaces caused to adjacent construction by selective demolition operations.
Patching is specified in Division 1 Section "Cutting and Patching."
Retain paragraph above and delete remainder of this Article, or delete paragraph above and retain and edit remainder of this Article, as applicable.
Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
Subparagraph below is an example of substrate preparation. Add to, revise, or delete as applicable.

Completely fill holes and depressions in existing masonry walls to remain with an approved masonry patching material, applied according to manufacturer's printed recommendations.
Restore exposed finishes of patched areas and extend finish restoration into adjoining construction to remain in a manner that eliminates evidence of patching and refinishing.

Insert specific refinishing requirements for floors, walls, and ceilings. Revise, delete, or modify below to suit Project.

DISPOSAL OF DEMOLISHED MATERIALS

Add any other specific disposal, cleanup, or removal requirements to suit Project.

General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

Burning: Do not burn demolished materials.

Retain above or below; burning is usually not permitted.

Retain below if disposal is permitted on Owner's property. Revise below, if applicable, to indicate limits on type of materials that may be disposed of on-site.

Delete above and retain below when disposal off Owner's property is required. Add specific requirements for off-site disposal to suit Project.

Disposal: Transport demolished materials off Owner's property and legally dispose of them.

SELECTIVE DEMOLITION SCHEDULE

Delete this Article when Drawings show all selective demolition notes and lists. When other Part3 articles above do not suffice, add a detailed selective demolition schedule below.

List items to be removed and salvaged.

Remove and reinstall the following:

List items to be removed and reinstalled.

END OF SECTION 02070

DIVISION 6
WOOD AND PLASTICS

06402 INTERIOR ARCHITECTURAL WOODWORK

Department of Safety
Richfield U.H.P. - I.T.S. Dispatch Modifications
Division of Facilities Construction Management

SECTION 06402 - INTERIOR ARCHITECTURAL WOODWORK
This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.
Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.
GENERAL
RELATED DOCUMENTS
Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
SUMMARY
This Section includes the following:
Adjust list below to suit Project and to distinguish interior architectural woodwork from items made from wood but specified as finish carpentry, stock cabinets, etc., in other Sections. AWI defines standing and running trim to include "rails used on corridor walls of hospitals or nursing homes, etc., and guard rails at glass openings."
Wood cabinets with plastic laminate.
Plastic-laminate countertops.
Related Sections include the following:
List below only products, construction, and equipment that the reader might expect to find in this Section but are specified elsewhere.
Supplemental Section in subparagraph below offers more choices for paneling types than this Section.
Division 8 Section "Flush Wood Doors."
DEFINITIONS
Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.
Delete below if no stairs or if carriages are included in rough carpentry.
SUBMITTALS
Select paragraph above or below and edit to suit Project, or delete both if not applicable.
Product Data: For medium-density fiberboard, plywood, high-pressure decorative laminate, adhesive for bonding plastic laminate, solid-surfacing material, cabinet hardware and accessories, handrail brackets, and finishing materials and processes.
Retain subparagraph below with either paragraph above. Delete if fire-retardant-treated wood is not required.
Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
Retain subparagraph below only for ornate, complex, or very high quality work.

Show details full size.
Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

Show locations and sizes of cutouts and holes for computer cord access, telephone and other cord access points and other items installed in architectural woodwork. Coordinate with Owner prior to completion of work.
Retain subparagraph below only for blueprint-matched work.
Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.
Delete subparagraph below if AWI standard is referenced.
Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.
Revise list below to suit Project.

Shop-applied finishes.
Plastic laminates.
Delete paragraph and subparagraphs above if colors and other characteristics are preselected and specified or scheduled. Retain paragraph and subparagraphs below with or without above.
Samples for Verification: For the following:

Delete items below not actually needed for control of grain character, color, and finish or expand to include other items. Sizes listed first are those in AWI standard. Revise if other sizes are required.
Plastic-laminate-clad panel products, 6 by 6 inches (200 by 250 mm), for each type, color, pattern, and surface finish.
Exposed cabinet hardware and accessories, one unit for each type and finish.
Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.
Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
QUALITY ASSURANCE
Delete paragraph below if fabricator is required to install woodwork.
Installer Qualifications: An experienced installer who has completed architectural woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
Fabricator Qualifications: A firm experienced in producing architectural woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
Delete paragraph below if installation by woodworker is not required or available.
Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of interior architectural woodwork with sequence-matched wood veneers including wood doors where veneer matching includes door faces.
Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.

Provide AWI certification labels or compliance certificate indicating that woodwork complies with requirements of grades specified.
Select paragraph and subparagraph above or paragraph and subparagraphs below. WIC should only be referenced for projects in California, Nevada, or Oregon; AWI can be referenced for projects anywhere in the U.S. See Evaluations. Review standard selected and coordinate its requirements with options selected. Certification programs of both organizations are available to member and nonmember firms. Contact either organization for a list of certified woodworkers in Project's location.
Delete paragraph below if no fire-retardant-treated materials or products are required.
Retain paragraph and subparagraphs below only for highest level of quality. See Evaluations. If retaining, indicate location, size, and other details of mockups on Drawings or by inserts. Revise wording if only one mockup is required.
Delete subparagraph above or below. Below is applicable only if mockups are erected as part of building rather than separately.
Delete below if work of this Section is not extensive or complex enough to justify a preinstallation conference. If retaining, coordinate with Division 1.
DELIVERY, STORAGE, AND HANDLING
Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.
PROJECT CONDITIONS
Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
Generally retain paragraph above; retain paragraph below if humidity will be controlled during occupancy. If retaining below, select one of three relative humidity ranges or insert another based on local climatological data. Three ranges given are for painted or finished woodwork. First applies to most of U.S., Ontario, and Quebec. Second applies to damp coastal areas of southern U.S. and maritime provinces. Third applies to dry southwestern U.S., Alberta, Manitoba, and Saskatchewan. For unfinished woodwork, narrower ranges will be required to maintain optimum moisture content. See discussion about relative humidity and moisture content and map at end of Section 1700 in AWI's quality standards.
Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and will maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 17 and 50 percent during the remainder of the construction period.
Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.
Delete below if not allowed.

Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

COORDINATION

Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

Retain below if cabinet locks or other hardware applied to woodwork, such as hinges and locks applied to wood jambs, are specified in a hardware section. Include a similar paragraph for other specific items requiring coordination, such as light fixtures installed in woodwork.

Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 8 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PRODUCTS

WOODWORK FABRICATORS

Retain this Article if list of preapproved woodworkers is used as quality-control procedure. See Evaluations.

Retain paragraph above if additional firms will be considered; retain below if not. If above is retained, include procedure for approving other firms in Instructions to Bidders.

Fabricators: Subject to compliance with requirements, provide interior architectural woodwork by a firm that has completed business activities within the local area for a period of not less than five years. Firm must have completed work to match type and scope of this project. At time of product submissions submit past work experience for consideration of Architect and Owner.

Insert list of preapproved firms. See AWI's "Source Book" for list of woodworking firms.

MATERIALS

General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

Delete paragraph above or below. Retain above if AWI standard is referenced and below if WIC is referenced.

If all transparent finished woodwork is same species and cut, retain paragraph above and delete separate requirements for species and cut in other articles; otherwise, delete paragraph above. Similarly, if all opaque woodwork is same species, retain paragraph below and delete separate requirements for species in other articles; otherwise, delete below.

Retain paragraph and appropriate subparagraphs below if AWI standard is used or if requirements for wood products selected exceed those in WIC standard.

Wood Products: Comply with the following:

Hardboard: AHA A135.4.

Medium-Density Fiberboard: ANSI A208.2, Grade MD

Selecting "Exterior Glue" in subparagraph above and below will eliminate formaldehyde from resins used to bind fibers or particles together but will decrease competition and may increase costs. Both standards require all products to comply with formaldehyde emission limits established by the U.S. Department of Housing and Urban Development. See Evaluations. Wil-

lamette's "Premier Plus" fiberboard is made with exterior glue. Particleboard with exterior glue is made by Rodman Industries; Div. of Fiberesin Industries.
Particleboard: ANSI A208.1, Grade M-2.
Softwood Plywood: DOC PS 1, Medium Density Overlay.
Hardwood Plywood and Face Veneers: HPVA HP-1.
Paragraph below describes Permalam, frequently called "melamine."
High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated, or if not indicated, as required by woodwork quality standard.
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Formica Corporation.
Wilsonart International; Div. of Premark International, Inc.
Pionite

Retain below for laboratory tops where high degree of chemical resistance is required.
Select one of first four paragraphs below or delete all and leave as woodworker's option. See AWI standard and Editing Instruction No. 2 in the Evaluations.
Adhesive below is suitable for general use and for postforming. Use only unpigmented product with through-color laminate. Water-based varieties must be used where VOC limits apply.
Adhesive for Bonding Plastic Laminate: Contact cement. Use only water based cement varieties to limit VOC.
Adhesive below is white or yellow wood glue and is good for use with through-color laminates. It is not for postforming and has poor water, chemical, and heat resistance.
CABINET HARDWARE AND ACCESSORIES
Where close matching of cabinet hardware and door hardware is required, it may be preferable to specify cabinet hardware in Division 8.
General: Provide cabinet hardware and accessory materials associated with architectural cabinets, except for items specified in Division 8 Section "Door Hardware (Scheduled by Describing Products)."
See Evaluations. Retain paragraph below if BHMA is used to specify or schedule hardware.
Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
Paragraphs below describing hardware items are examples only; edit to suit Project. Delete if schedule is included on Drawings.
Hinges below are not as strong as heavy-duty butt hinges above.
Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing where noted as such.
Wire Pulls: Back mounted, 5 inches (100 mm) long, 5/16 inches (8 mm) in diameter.
First option in paragraph below specifies standards and clip-type rests for mounting at ends of shelves; second specifies standards and knife-type brackets for mounting at rear of shelves.

Adjustable Shelf Standards and Supports: BHMA A156.9, B04102; with shelf brackets, B04112.
Shelf rests below are installed in holes drilled in cabinet sides and partitions.
Door Locks: BHMA A156.11, E07121.
Locks specified above and below are deadbolt locks, surface mounted on inside of door or drawer with only cylinder exposed on outside; revise either if another type of lock is required. Below are two of many sizes offered. Other colors, materials, and styles are also available. 1-1/4-inch (32-mm) grommet is OG series; 2-inch (51-mm) grommet is SG series.
First option in paragraph below specifies standards and clip-type rests for mounting at ends of shelves; second specifies standards and knife-type brackets for mounting at rear of shelves.
Shelf rests below are installed in holes drilled in cabinet sides and partitions.
Shelf Rests: BHMA A156.9, B04013.
Locks specified above and below are deadbolt locks, surface mounted on inside of door or drawer with only cylinder exposed on outside; revise either if another type of lock is required. Below are two of many sizes offered. Other colors, materials, and styles are also available. 1-1/4-inch (32-mm) grommet is OG series; 2-inch (51-mm) grommet is SG series.
12-inch (305-mm) slot is Model CP-2; 17-inch (432-mm) slot is Model CP-1.
Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
Below are examples only. Revise to suit Project. If more than one finish is required, indicate location of each here or on Drawings. See Evaluations.
Satin Stainless Steel: BHMA 630.
For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
INSTALLATION MATERIALS
Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
Delete paragraph above or below, or both, if included in a carpentry section.
Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.
Select paragraph above or below, or both, if rail brackets are required.
FABRICATION, GENERAL
If all woodwork is same grade, retain paragraph below and delete separate grades in other articles; otherwise, delete paragraph below.
Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
Revise subparagraphs below to describe conditions where eased edges are or are not required.

Corners of Cabinets and Edges of Solid-Wood (Lumber) Members 3/4 Inch (19 mm) Thick or Less: 1/16 inch (1.5 mm).
Edges of Rails and Similar Members More Than 3/4 Inch (19 mm) Thick: 1/8 inch (3 mm).
For highest-quality work, delete two subparagraphs above and retain subparagraph below; otherwise, delete below.

Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: 1/16 inch (1.5 mm).
Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
Retain subparagraph below if Architect will visit woodwork shop and examine work before it is shipped to Project site.
Retain subparagraph below for high-quality and large or complex work.
Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
PLASTIC-LAMINATE CABINETS
For AWI-referenced woodwork, retain reference to NEMA standard in "Materials" Article at beginning of Part 2.
Quality Standard: Comply with AWI Section 400 requirements for laminate cabinets.
Delete paragraph above or below.
Retain one of four grades below or delete paragraph if one grade is specified for all interior woodwork. Laboratory grade only applies to WIC. If Laboratory grade is retained, special finishes must be inserted in "Shop Finishing" Article. See Evaluations and WIC's manual.
Grade: Custom.
WIC Construction Style: Style A, Frameless.
WIC Construction Type: Type I, multiple self-supporting units rigidly joined together.
AWI Type of Cabinet Construction: Reveal overlay.
Retain one of six options in paragraph above if AWI standard is referenced. If WIC standard is referenced, delete AWI construction types above and retain one requirement for WIC construction style, construction type, and door and drawer front style from sets below. See WIC's manual in making selections.
Delete paragraph below if reveal overlay construction is not used. Dimension given is an example only.
Reveal Dimension: 1/8 inch.
Laminate Cladding for Exposed Surfaces: High-pressure decorative laminate complying with the following requirements:
AWI and WIC standards require minimum thickness of 0.028 inch 0.7 mm regardless of surface type. HGS is 0.048 inch 1.2 mm thick, HGL and HGP are 0.039 inch 1.0 mm thick, and VGS is 0.028 inch 0.7 mm thick.

Horizontal Surfaces Other Than Tops: **HGS**.
Subparagraph above refers to horizontal surfaces other than tops, which are specified in another Article.

Postformed Surfaces: **HGP**.
Vertical Surfaces: **HGS**
Retain one edge construction from subparagraph below. Coordinate with standards and grade selection.
Edges: Plastic Laminate, match drawer faces
Materials for Semiexposed Surfaces: Provide surface materials indicated below:
Retain one each from three groups below or revise to suit Project.

Surfaces Other Than Drawer Bodies: Thermoset decorative overlay or as indicated on drawings.
Drawer Sides and Backs: Thermoset decorative overlay or as indicated on drawings.
Drawer Bottoms: Thermoset decorative overlay or as indicated on drawings.

Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
Retain one of three subparagraphs below. If retaining first, indicate colors, patterns, and finishes in a separate schedule.

Plastic Laminate at cabinets: Wilsonart Laminate or approved equal: Color Wild Cherry 7054-60
Delete below if not desired. Dust panels are not required by standards.
Provide dust panels of 1/4-inch (6.4-mm) plywood or tempered hardboard above compartments and drawers, unless located directly under tops.
Insert requirements for fire-rated frames if needed; copy from "Interior Frames and Jambs for Transparent Finish" Article and revise to suit Project.
Generally retain subparagraph below. WIC does not require backpriming; AWI only requires it for certain items and grades. Backpriming helps moderate alternating shrinking and swelling caused by fluctuations in moisture content resulting from variations in relative humidity.
If WIC standards are referenced and Laboratory grade is retained for casework, insert special finishes required.
EXECUTION
PREPARATION
Condition woodwork to average prevailing humidity conditions in installation areas before installation.
Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.
INSTALLATION
Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in Part 2 of this Section for type of woodwork involved.
Delete paragraph above or below. Revise if installation grade is different.
Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).
Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
Delete paragraph below if no fire-retardant-treated wood.

Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
Delete paragraph and subparagraphs below if not applicable or considered necessary.
Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
Maintain veneer sequence matching of cabinets with transparent finish.
Revise requirements in subparagraph below as necessary for seismic restraint of cabinets. Delete if hanging cleats are used and are detailed on Drawings.
Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for 1-inch (25-mm) penetration into wood framing, blocking, or hanging strips. No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
Delete paragraph and associated subparagraphs above if no cabinets; delete below if no tops that are not a part of base cabinets.
Delete paragraph and subparagraph below if no paneling.
Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.
Delete paragraph above or below, or both, to agree with selections made in "Shop Finishing" Article.
Refer to Division 9 Sections for final finishing of installed architectural woodwork.
ADJUSTING AND CLEANING
Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
Clean, lubricate, and adjust hardware.
Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.
END OF SECTION 06402

DIVISION 7
THERMAL AND MOISTURE PROTECTION

07920 JOINT SEALANTS

Department of Safety
Richfield U.H.P. - I.T.S. Dispatch Modifications
Division of Facilities Construction Management

This Short Language Version (SLV) Section was condensed from the updated Basic Version Section of the same title and number. Refer to the Basic Version Section Cover sheet for changes from the previous edition of this Section.
Caution: Use Short Language Version Sections for small, simple, private projects that are negotiated rather than bid. Use for projects limited to traditional materials and methods. Use for projects where the Architect has reduced Contract administration responsibilities.
Refer to the Basic Version Section when editing this SLV Section. The Basic Section contains comprehensive notes and requirements plus a greater number of options. Refer to the Basic Version Section's Evaluations for guidance in editing this SLV Section.
This SLV Section specifies elastomeric, solvent-release-curing, latex, and miscellaneous joint sealants for general applications, excluding glazing.
SECTION 07920 - JOINT SEALANTS
GENERAL
Preconstruction Joint-Sealant-Substrate Tests: Submit substrate materials, representative of actual joint surfaces, to joint sealant manufacturer for laboratory testing of joint sealants for adhesion to primed and unprimed substrates and for compatibility with joint substrates and other joint-related materials.
Submittals: In addition to Product Data, submit the following:

Samples of each type and color of joint sealant required.
Test reports for joint sealants evidencing compliance with requirements.
PRODUCTS
Elastomeric Sealant Manufacturers: Subject to compliance with requirements, provide sealants by one of the following:

Silicone Sealants:

Bostik Inc.
Dow Corning.
NUCO Industries, Inc.
Polymeric Systems, Inc.
Sonneborn Building Products Div., ChemRex Inc.
Tremco.

Urethane Sealants:

W.R. Meadows, Inc.
Pacific Polymers, Inc.
Polymeric Systems, Inc.
Sika Corporation.
Sonneborn Building Products Div., ChemRex Inc.
Tremco.

Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by testing and field experience.
Colors: Provide colors indicated for exposed joint sealants or, if not indicated, as selected by Architect from manufacturer's full range for this characteristic.
Elastomeric Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant of base polymer specified below:
Revise or delete any of the following generic descriptions not required. See Basic Section for product listings.

Medium-Modulus Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; with the additional capability, when tested per ASTM C 719, to withstand 50 percent movement in both extension and compression for a total of 100 percent movement and still comply with other requirements of ASTM C 920; and as follows:

Uses NT, M, G, A, and O.

Single-Component Nonsag Urethane Sealant: Type S; Grade NS; and as follows:

Class 12-1/2.
Class 25.
Uses NT, M, G, A, and O.
Uses NT, M, A, and O.
Latex Sealant: ASTM C 834.
Retain one requirement from each set of choices below to correlate with products. See Basic Section.
Sealant Backings, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
Cylindrical Sealant Backings: ASTM C 1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

Type C: Closed-cell material with a surface skin.
Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F (minus 32 deg C).
Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.
Primer: As recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated.
EXECUTION
General: Comply with joint sealant manufacturer's instructions for products and applications indicated.
Sealant Installation Standard: Comply with ASTM C 1193.
END OF SECTION 07920

DIVISION 8
DOORS AND WINDOWS

SECTION 08110 - STEEL DOORS AND FRAMES

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes steel doors and frames.

Related Sections: The following Sections contain requirements that relate to this Section:

List below only products, construction, and equipment for this Project that the reader might expect to find in this Section but are specified elsewhere. Verify that the Section titles listed below for this Project's Specifications are correct.

Division 8 Section "Door Hardware" for door hardware

Division 8 Section "Glazing" for glass in steel doors and sidelights.

Division 9 Section "Gypsum Board Assemblies" for spot grouting frames in gypsum board partitions.

Division 9 Section "Painting" for field painting primed doors and frames.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, profiles, and finishes.

Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

Usually retain requirement below for door schedule.

Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.

Indicate coordination of glazing frames and stops with glass and glazing requirements.

Delete above if colors are preselected and specified or scheduled. Retain below with or without above.

Delete below if not required.

QUALITY ASSURANCE

Retain below and other references to SDI for quality control.

Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

Delete below if not applicable.

Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E 152, and are labeled and

listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

Delete below if not applicable or not acceptable to authorities having jurisdiction.
Delete below if not required by code.
Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.
DELIVERY, STORAGE, AND HANDLING
Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.
Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.
PRODUCTS
MANUFACTURERS
Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Manufacturers: Subject to compliance with requirements, provide products by one of the following:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Steel Doors and Frames:

Amweld Building Products, Inc.
Benchmark Commercial Doors.
Ceco Door Products.
Copco Door Co.
Curries Co.
Deansteel Manufacturing Co.
Fenestra Corp.
Kewanee Corp.
Mesker Door, Inc.
Pioneer Industries.
Republic Builders Products.
Steelcraft.
Manufacturers below only provide prefinished frames. Some manufacturers above can also furnish prefinished frames.

MATERIALS
Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM A 569M).
Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366 (ASTM A 366M), commercial quality, or ASTM A 620 (ASTM A 620M), drawing quality, special killed.
Retain below for exterior units or if required in high-humidity areas.
Supports and Anchors: Fabricated from not less than 0.0478-inch- (1.2-mm-) thick steel sheet; 0.0516-inch- (1.3-mm-) thick galvanized steel where used with galvanized steel frames.
Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.
DOORS
Refer to SDI 108 for recommended selection and usage guides. Indicate grades and type (design) of each door on Drawings as required. See Evaluations.
Steel Doors: Provide 1-3/4-inch- (44-mm-) thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:
Select appropriate doors from examples below or edit as required for Project. Possibly identify doors by application (stairwell, classroom, closet doors, etc.).

Interior Doors: Grade II, heavy-duty, Model 2, seamless design, minimum 0.0478-inch- (1.2-mm-) thick cold-rolled steel sheet faces.
Delete below if door louvers are not required or revise to include other types, such as pierced louvers, adjustable louvers, air grilles, and galvanized exterior louvers with insect screens.
FRAMES
Below is also available in 0.0747- and 0.0598-inch (1.9- and 1.5-mm) thicknesses.
Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 0.0478-inch- (1.2-mm-) thick cold-rolled steel sheet.
Retain or revise 1 of first 3 subparagraphs below to suit Project.

Fabricate frames with mitered or coped and continuously welded corners.
Fabricate frames for interior openings over 48 inches (1220 mm) wide from 0.0598-inch- (1.5-mm-) thick steel sheet.
Delete above or below or both if not required.

Delete below where adhesive-backed "stick-on" silencers are used instead of push-in type.
Door Silencers: Except on weatherstripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.
Plaster Guards: Provide minimum 0.0179-inch- (0.45-mm-) thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
FABRICATION
Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work

that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:
Core materials below are options; see Evaluations. Delete those not desired for Project.

Rigid polyurethane conforming to ASTM C 591.

Clearances: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors. Not more than 3/4 inch (19 mm) at bottom.

Fire Doors: Provide clearances according to NFPA 80.
Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel sheet.
Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
Delete below if not required. Revise as required.
Exposed Fasteners: Not allowed
Delete below if not required.
Delete below if not required.
Sound-Rated (Acoustical) Assemblies: Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413.
Value below is maximum rating for standard weatherstripped doors by most manufacturers. See Evaluations.

Unless otherwise indicated, provide acoustical assemblies with STC sound ratings of 33 or better.
Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.
Delete below if not applicable.
Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
Glazing Stops: Minimum 0.0359-inch- (0.9-mm-) thick steel or 0.040-inch- (1-mm-) thick aluminum.

Provide nonremovable stops on secure side of interior doors for glass panels in doors.

FINISHES, GENERAL
Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
Delete below if no steel sheet.
Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes.
Apply organic finishes to doors and frames after fabrication.
To ensure obtaining exact finish desired, insert product and manufacturers' names of coating system or systems.
STEEL SHEET FINISHES
Delete this Article if no uncoated steel sheet doors or frames.
Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.
Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.
Delete below if no factory-applied baked-enamel finish for steel sheet.
To ensure obtaining exact finish desired, insert product and manufacturers' names of coating system or systems.
EXECUTION
INSTALLATION
General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
Edit below to suit Project.
In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
Install fire-rated frames according to NFPA 80.
Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.
Delete below if not applicable.

Fire-Rated Doors: Install with clearances specified in NFPA 80.
Smoke-Control Doors: Comply with NFPA 105.
ADJUSTING AND CLEANING

Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.
END OF SECTION 08110

DIVISION 9
FINISHES

SECTION 09255 - GYPSUM BOARD ASSEMBLIES

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes the following:

Adjust list below to suit Project.

Nonload-bearing steel framing members for gypsum board assemblies.

Gypsum board assemblies attached to steel framing.

Delete below if specified in Division 9 Section "Tile."

DEFINITIONS

Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

ASSEMBLY PERFORMANCE REQUIREMENTS

Delete below if STC-rated assemblies are not required. If retaining paragraph, indicate STC ratings on Drawings.

Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those of assemblies whose STC ratings were determined according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

Delete below if no fire-rated gypsum board assemblies.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data for each type of product specified.

Delete below if control- and expansion-joint locations are indicated and fully detailed on Drawings.

Normally delete below. Retain only if manufacturers specified will provide Project specific certificates.

Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

QUALITY ASSURANCE

Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.

Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

Delete below if no fire-rated assemblies.

Delete below if not required. If retaining, indicate location, size, and other details of mockups on Drawings or by inserts.

DELIVERY, STORAGE, AND HANDLING

Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

Neatly stack gypsum panels flat to prevent sagging.

PROJECT CONDITIONS

Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.

Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.

Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PRODUCTS

MANUFACTURERS

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:

Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Steel Framing and Furring:

Clark Steel Framing, Inc.
Consolidated Systems, Inc.
Dale Industries, Inc.
Dietrich Industries, Inc.
Marino/Ware (formerly Marino Industries Corp.).
National Gypsum Co.; Gold Bond Building Products Division.

Gypsum Board and Related Products:

Manufacturers listed below market products nationally. Insert names of other gypsum manufacturers if their products are available in Project area and comply with specified requirements. See Evaluations for listing of members of the Gypsum Association (GA). Not all manufacturers offer a full range of related products.

Domtar Gypsum.
Georgia-Pacific Corp.

National Gypsum Co.; Gold Bond Building Products Division.
United States Gypsum Co.
Delete both paragraphs and list of products below if no proprietary wallboard products are specified. Fire-resistance ratings for assemblies using proprietary gypsum board panels only apply to assemblies identical in materials and construction to those tested. If more than one product is acceptable for use in fire-resistance-rated assemblies, indicate on Drawings that entire tested assembly incorporating the particular product option selected is required.
Available Products: Subject to compliance with requirements, products that may be incorporated in the Work where proprietary gypsum wallboard is indicated include, but are not limited to, the following:
Retain above for nonproprietary or below for semiproprietary Specification. Correlate with "Manufacturers" Paragraph retained above. Refer to Division 1 Section "Materials and Equipment."
Products: Subject to compliance with requirements, provide one of the following products where proprietary gypsum wallboard is indicated:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers. Products below have a fire resistance greater than manufacturer's standard Type X wallboard.

Gyprock Fireguard C Gypsum Board; Domtar Gypsum.
Firestop Type C; Georgia-Pacific Corp.
Fire-Shield G; National Gypsum Co.; Gold Bond Building Products Division.
SHEETROCK Brand Gypsum Panels, FIRECODE C Core; United States Gypsum Co.
STEEL FRAMING FOR WALLS AND PARTITIONS
Delete Article if no steel framing for walls and partitions. Before selecting thicknesses and depths of framing members, check manufacturers' data for height and deflection requirements.
General: Provide steel framing members complying with the following requirements:
Retain above or below. Verify availability and weight of galvanized coatings with manufacturers.
Protective Coating: Manufacturer's standard corrosion-resistant coating.
Retain below if galvanized coating is only required at exterior and building perimeter locations.
Protective Coating: ASTM A 653, G 40 (ASTM A 653M, Z 90) hot-dip galvanized coating for framing members attached to and within 10 feet (3 m) of exterior walls.
Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch- (5-mm-) wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
Steel Studs:
Thickness: 20 ga unless noted otherwise as indicated on documents.
GA-219 recommends 0.0329-inch- (0.84-mm-) thick framing for both standard-weight and heavy doors. GA-219 also includes an alternate detail for 0.0179-inch- (0.45-mm-) thick framing with 2 nested studs at each jamb for slip-on door frames supporting standard-weight doors.

For head runner, sill runner, jamb, and cripple studs at door and other openings.

Depth: 3-5/8 inches (92.1 mm), unless otherwise

Runners:

1. Thickness: 20 ga unless noted otherwise as indicated on documents.

a. Depth: 3-5/8 inches (92.1 mm), unless otherwise indicated.

Retain above or below, or delete both if not required or if slip-joint to avoid axial loading of partition is otherwise detailed. If above is retained, studs should not be attached directly to track. Detail bracing requirements to prevent lateral movement.

Deflection Track: Manufacturer's standard top runner designed to prevent cracking of gypsum board applied to interior partitions resulting from deflection of the structure above fabricated from steel sheet complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M). Thickness as indicated for studs, and width to accommodated depth of studs, and of the following configuration:

Retain 1 of 3 subparagraphs below. Both configurations are designed to allow attachment of studs to track.

Above is available from Metal-Lite, Inc. This product has been tested in fire-resistance assemblies with "Monokote MK-6" sprayed-on cementitious fireproofing produced by W.R. Grace & Co. installed in the track. If fire-resistance-rated assemblies are required, detail assemblies on Drawings and correlate with requirements of Division 7 Section "Sprayed-on Fireproofing."

Top runner with 2-1/2-inch- (63.5-mm-) deep flanges that either have V-shaped offsets that compress when pressure is applied from construction above or have slots 1 inch (25.4 mm) o.c. that allow fasteners attached to studs through the slots to accommodate structural movement by slipping.

Available Products: Subject to compliance with requirements, products that may be incorporated in the Work include, but are not limited to, the following:

Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."

Products: Subject to compliance with requirements, provide one of the following:

See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Correlate list below with configuration requirement retained above.

Superior Flex Track System (SFT); Delta Star, Inc.
SLP-TRK; Metal-Lite, Inc.

Paragraph and subparagraphs below specify proprietary product for isolating partition framing from structure above in specific fire-resistance-rated assemblies. This product is also useful for applications where sound control is important. Delete below if no rated assemblies or edit text to suit Project if product is used for sound control applications only. Detail bracing requirements to prevent lateral movement.

Deflection Track: Top runner designed to allow partition heads to expand and contract with movement of structure above while maintaining continuity of the assembly. Comply with requirements of ASTM C 645 except configuration, of thickness indicated for studs and width to accommodate depth of studs indicated with flanges offset at midpoint to accommodate gypsum board thickness.

Retain 1 of 3 offset configuration requirements below.
Available Product: Subject to compliance with requirements, a product that may be incorporated in the Work includes, but is not limited to, "Fire Trak" manufactured by Fire Trak Corp.
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment." See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.
Below is available in 1-inch (25.4-mm), 1-1/2-inch (38.1-mm), 2-inch (50.8-mm), 2-1/2-inch (63.5-mm), and 3-inch (76.2-mm) depths. United States Gypsum Co.'s product has slotted web.
Retain below if channel bridging is detailed on Drawings.
Retain below if steel sheet blocking or bracing is required. Indicate locations, lengths, and widths on Drawings or add a detailed description to Text.
Steel Flat Strap and Backing Plate: Steel sheet for blocking and bracing complying with ASTM A 653 (ASTM A 653M) or ASTM A 568 (ASTM A 568M), length and width as indicated, and with a minimum base metal (uncoated) thickness as follows:

Thickness: 0.0598 inch (1.5 mm) where indicated.
Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved; complying with the recommendations of gypsum board manufacturers for applications indicated.
GYPSUM BOARD PRODUCTS
General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.

Widths: Provide gypsum board in widths of 48 inches (1219 mm).
Retain above or below. Below is SI (metric) module dimension.
Gypsum Wallboard: ASTM C 36 and as follows:
Delete types below if not required. Indicate on Drawings if fire-resistant types occur. See Evaluations.
Type: Type X where for all assemblies.
If proprietary type is retained below, name products under "Manufacturers" Article.
Type: Proprietary type as required for specific fire-resistance-rated assemblies.
Select one edge requirement below.
Edges: Tapered.
Thickness: 5/8 inch (15.9 mm)
Delete below if no multilayer applications. See Evaluations.
Delete below if cementitious backer units are exclusively specified as base for tile.
Below refers to "Dens-Shield Tile Backer" by Georgia-Pacific.
TRIM ACCESSORIES
Accessories for Interior Installation: Cornerbead, edge trim, and control joints complying with ASTM C 1047 and requirements indicated below:

Material: Formed metal or plastic, with metal complying with the following requirement:

Steel sheet zinc coated by hot-dip process or rolled zinc.
Delete above or below. Coating weight for hot-dip galvanized coating is G 30 per ASTM C 1047, which, unlike other finishes and rolled zinc, is not required to undergo 120-hour salt-spray performance test without showing any red oxidation.

Shapes indicated below by reference to Fig. 1 designations in ASTM C 1047:
Retain shapes required from choices below.

Cornerbead on outside corners, unless otherwise indicated.
LC-bead with both face and back flanges; face flange formed to receive joint compound. Use LC-beads for edge trim, unless otherwise indicated.
L-bead with face flange only; face flange formed to receive joint compound. Use L-bead where indicated.
U-bead with face and back flanges; face flange formed to be left without application of joint compound. Use U-bead where indicated.
One-piece control joint formed with V-shaped slot and removable strip covering slot opening.
Delete below if no curved edges.
Delete below if no exterior gypsum board installations, or revise if accessories formed from another material are acceptable.
Accessories for Exterior Installations: Cornerbead, edge trim, and control joints formed from steel sheet zinc coated by hot-dip process or rolled zinc complying with ASTM C 1047, in shapes indicated below by reference to Fig. 1 designations in ASTM C 1047.
Only control-joint shape listed below is produced in rolled zinc. Specialized shapes not included in the referenced standard are produced by some manufacturers in break-formed zinc. Revise text to include these products, if required.

Cornerbead on outside corners, unless otherwise indicated.
Edge trim complying with shape LC-bead per Fig. 1, unless otherwise indicated.
Delete paragraph and subparagraphs below if no aluminum accessories.
JOINT TREATMENT MATERIALS
General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.
Paper tapes with pressure-sensitive adhesive backing are available. If added to Text, verify acceptability with manufacturers listed. Glass-fiber-mesh joint tapes, with or without pressure-sensitive adhesive backing, are also available but are only approved by manufacturers for use with selected setting-type joint compounds.
Joint Tape for Gypsum Board: Paper reinforcing tape, unless otherwise indicated.
Delete below if not applicable.
Retain below if cementitious backer units are specified in this Section.
Joint compounds listed below are usual range of product choices available. Before editing below, edit Part 3 "Finishing Gypsum Board Assemblies" Article to determine which compound products to retain. See Evaluations for considerations involved in selecting joint compounds.
Drying-Type Joint Compounds for Gypsum Board: Factory-packaged vinyl-based products complying with the following requirements for formulation and intended use.

Correlate formulation and compound types with finishing requirements in Part 3. According to manufacturers, ready-mixed formulations make up majority of sales.

Ready-Mixed Formulation: Factory-mixed product.

Taping compound formulated for embedding tape and for first coat over fasteners and face flanges of trim accessories.
Topping compound formulated for fill (second) and finish (third) coats.
All-purpose compound formulated for both taping and topping compounds.
Delete below if cementitious backer units are not specified in this Section or if finishing of cementitious backer units included in this Section is work of Division 9 Section "Tile."
ACOUSTICAL SEALANT
Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
United States Gypsum Co. advertises that its acoustical sealant has flame-spread and smoke-developed ratings of less than 25 per ASTM E 84. Insert this requirement above if required for sealant by authorities having jurisdiction.
Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce transmission of airborne sound.
Available Products: Subject to compliance with requirements, acoustical sealants that may be incorporated in the Work include, but are not limited to, the following:
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Products: Subject to compliance with requirements, provide one of the following:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Acoustical Sealant for Exposed and Concealed Joints:

PL Acoustical Sealant; ChemRex, Inc.; Contech Brands.
AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
SHEETROCK Acoustical Sealant; United States Gypsum Co.
MISCELLANEOUS MATERIALS
General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.
Delete materials not applicable to Project.
Spot Grout: ASTM C 475, setting-type joint compound recommended for spot-grouting hollow metal door frames.
Steel drill screws complying with ASTM C 1002 for the following applications:
Delete applications below not required for Project.

Fastening gypsum board to steel members less than 0.033 inch (0.84 mm) thick.
Retain below if framing members of thicknesses indicated are specified in this Section or load-bearing steel framing is specified in Division 5 Sections.
Steel drill screws complying with ASTM C 954 for fastening gypsum board to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
Retain below if cementitious backer units are specified in this Section.
Retain one or both paragraphs below for use as separation between steel framing and exterior walls.
Sound-Attenuation Blankets: Unfaced mineral-fiber blanket insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C 665 for Type I (blankets without membrane facing).
Retain 1 of 3 below. If used in fire-resistance-rated assemblies, verify that mineral-fiber types retained correspond with requirements of tested assemblies.
Mineral-Fiber Type: Fibers manufactured from glass.
Retain above or below for insulation between Z-furring members or revise if other types of insulation materials are desired. Verify code compliance of below with authorities having jurisdiction.
Retain below or insert another product if separately applied vapor barrier is required over wood framing and its installation is specified in this Section. Do not use where vapor retarder will remain exposed to plenums, attics, and crawl spaces.

EXAMINATION
Revise below to suit Project conditions and construction.
Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.
Delete below if anchorage devices are not used or if specified in other Sections.
INSTALLING STEEL FRAMING, GENERAL
ASTM C 840 includes installation requirements that are not included in ASTM C 754.
Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
Indicate isolation details on Drawings or insert detailed description here.
Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
Below are examples only. Retain or revise to suit Project.

Where building structure abuts ceiling perimeter or penetrates ceiling.
Where partition framing and wall furring abut structure, except at floor.

Retain above or below. Retain above if details are provided on Drawings or revise to describe connection required. Retain below if deflection track is specified in Part 2. Verify isolation provisions for fire-resistance-rated construction comply with requirements of rated assemblies.
Install deflection track top runner to attain lateral support and avoid axial loading.
Retain below if proprietary fire-resistance-rated deflection and firestop track is specified in Part 2. Indicate locations of assemblies incorporating product on Drawings.
Delete below if not required by authorities having jurisdiction or Project conditions.

Attach jamb studs at openings to tracks using manufacturer's standard stud clip.
Include details on Drawings showing control- and expansion-joint construction and locations for both fire-resistance-rated and nonrated assemblies.
Show framing details for below on Drawings.
INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS
Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
Retain below if studs will abut masonry or dissimilar metals at exterior walls. Revise if only one type of separation material is acceptable.
Below is based on recommendation in GA-216 for framing. ASTM C 840 requires only that framing and substrates be installed so that after gypsum board has been installed, the finished surface will be in an even plane. Delete below if ASTM C 840 requirement is acceptable.
Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

Delete below if perimeter relief is not required or revise to suit Project if deflection track is specified in Part 2.
Retain below or revise to suit Project. For complex conditions, include details of closures on Drawings.
For STC-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
Retain above and below or revise to make below the default requirement and above the exception; or delete both if not applicable (e.g., no suspended ceilings).
Install steel studs and furring in sizes and at spacings indicated.
Below are examples of default requirements. ASTM C 754 tabulates maximum framing spacing based on thickness and orientation of gypsum board panels and deflection and lateral loading. Manufacturers' literature is also a valuable resource. Retain applicable requirements or revise. Delete if spacing is indicated on Drawings.

Single-Layer Construction: Space studs 16 inches (406 mm) o.c., unless otherwise indicated.

Below corresponds to SI (metric) module.
Below corresponds to SI (metric) module.
Revise below if 16-inch (406-mm) spacing is required. ASTM C 754 does not include 16-inch (406-mm) spacing for double-layer construction. If multiple layers are used to achieve fire-resistance rating, verify stud spacing requirements of specific assemblies required and revise below to suit Project.
Below corresponds to SI (metric) module.
Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
Usually retain below with requirement for 0.0329-inch- (0.84-mm-) thick studs in Part 2 for heavy doors, 200 to 300 lb (90.72 to 136.08 kg), up to 48 inches (1219 mm) wide. Framing for doors over 48 inches (1219 mm) wide, double doors, and extra-heavy doors should be designed to meet loading conditions.

Install 2 studs at each jamb, unless otherwise indicated.
Retain below if one-piece zinc control joints are required at head.
Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
Retain below if suspended ceilings are not capable of withstanding door opening and closing forces.
Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
Delete below if no framed openings other than doors, or revise to suit Project. Framing installation for large openings should be fully detailed.
Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.
APPLYING AND FINISHING GYPSUM BOARD, GENERAL
Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
Install sound-attenuation blankets, where indicated, prior to installing gypsum panels unless blankets are readily installed after panels have been installed on one side.
Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels.
Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

Attach gypsum panels to framing provided at openings and cutouts.
Delete if gypsum panels are not used over wood framing.
Delete below if hollow metal door frames are not used in steel-framed partitions.
Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.

Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
Fit gypsum panels around ducts, pipes, and conduits.
Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
Below is feasible only with wood framing where fire ratings are not required. Delete for metal-framed gypsum board assemblies.
Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
Below is a requirement of BOCA National Building Code. Retain if required by local code.

Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
GYPSUM BOARD APPLICATION METHODS
Single-Layer Application: Install gypsum wallboard panels as follows:

Delete below if no gypsum board ceilings.
Delete above or below. Orientation of panels affects framing spacing as well as appearance. See Evaluations.
On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless parallel application is required for fire-resistance-rated assemblies. Use maximum-length panels to minimize end joints.

Stagger abutting end joints not less than one framing member in alternate courses of board.
Usually retain below if vertical application of panels is specified.
Delete below if no gypsum board ceilings.
Revise below if wall conditions permit economical use of horizontal application of base layer and laminated attachment method is used.
Delete below if no Z-furring members.
Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
Retain below for attachment to metal or wood supports.

Fasten with screws.

Retain one of the following for wood supports if screw attachment is not required.
Retain one of the following.
Above and below are suitable for metal or wood supports; above method is required for certain fire-resistance-rated assemblies.
Insert specific requirements (if known) for particular system substrate.
Delete paragraph and subparagraphs below if curved partitions are not indicated for Project.
INSTALLING TRIM ACCESSORIES
General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
Below are examples of universal scope definitions for using trim. Revise as desired or show on Drawings.
Install cornerbead at external corners.
Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.

Install LC-bead where gypsum panels are tightly abutted to other construction and back flange can be attached to framing or supporting substrate.
Install L-bead where edge trim can only be installed after gypsum panels are installed.
Install U-bead where indicated.
Indicate locations for below on Drawings.
Install aluminum trim and other accessories where indicated.
Install control joints at locations indicated.
Delete above or below. If above is retained, locate joints on Drawings to comply with ASTM C 840 requirements for spacing control (expansion) joints.
FINISHING GYPSUM BOARD ASSEMBLIES
General: Treat gypsum board joints, interior angles, flanges of cornerbead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.
Delete above or below. Standard steel or zinc trim accessories have flanges formed to receive joint compound without tape. Retain below if aluminum and other trim accessories require tape and joint compound on flanges to prevent cracking.
Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
Delete levels below that do not apply to Project. GA-214 also includes Level 0 (no taping, finishing, or accessories) for temporary construction and where final decoration is undetermined. If inserting Level 0, modify "Apply Joint Tape" Pparagraph above to allow this exception. GA-216 also includes recommended locations for each finish level. Although this information may be added to subparagraphs below, the following subparagraphs assume that finish Level 4 predomi-

nates and exceptions will be indicated on Drawings. Correlate with other paragraphs in Article specifying number of coats of joint compound. See Editing Instruction No. 3 in the Evaluations. Retain only one subparagraph from above and below or delete both. Delete above if no tile substrates are specified in this Section.

According to GA-214, Level 4 finish below is suitable for surfaces receiving light textured finish wallcoverings, and flat paints over light textures.
Level 4 for gypsum board surfaces, unless otherwise indicated.
According to GA-214, Level 5 finish below is suitable for surfaces receiving gloss and semigloss enamels and nontextured flat paints.
Use one of the following joint compound combinations as applicable to the finish levels specified:
Delete above or below. Retain above when more than one combination of joint compounds is acceptable. Retain below if choice is limited to one combination. See Evaluations for information on different combinations of joint compound. See Editing Instruction No. 4 in the Evaluations.
Use the following joint compound combination as applicable to the finish levels specified:

Delete below if Level 5 is not required for Project.
Paragraph below assumes Level 4 finish is default requirement. If not, revise or delete paragraph to suit Project.
For Level 4 gypsum board finish, embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as needed to produce a surface free of visual defects and ready for decoration.
Joint compound combinations below assume finish Level 4 or 5 is required for Project. If neither Level 4 nor 5 is specified, delete coats not required for finish levels specified. Correlate products named in combinations below with products described in Part 2 "Joint Treatment Materials" Article.
Embedding and First Coat: Ready-mixed, drying-type, all-purpose or taping compound. Fill (Second) Coat: Ready-mixed, drying-type, all-purpose or topping compound. Finish (Third) Coat: Ready-mixed, drying-type, all-purpose or topping compound.
Delete below if Level 3 finish is not required for Project.
Delete below if exterior gypsum soffit board is not required for Project.
Delete below if no water-resistant gypsum backing board.
FIELD QUALITY CONTROL
Delete Article if no gypsum board ceiling areas or if above-ceiling observation is not required for Project.
Above-Ceiling Observation: Architect will conduct an above-ceiling observation prior to installation of gypsum board ceilings and report any deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.

Notify Architect one week in advance of the date and the time when the Project, or part of the Project, will be ready for an above-ceiling observation.

CLEANING AND PROTECTION
Promptly remove any residual joint compound from adjacent surfaces.
Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.
END OF SECTION 09255

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes ceilings consisting of acoustical panels and exposed suspension systems.

SUBMITTALS

Product Data: For each type of product specified.

Retain paragraph below if Drawings do not include detailed reflective ceiling plans or if Project involves unusual coordination requirements.

Coordination Drawings: Drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

Edit list below to suit Project.

Ceiling suspension system members.

Method of attaching suspension system hangers to building structure.

Ceiling-mounted items including light fixtures; air outlets and inlets; speakers; sprinklers; and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.

Retain one of four subparagraphs below.

Samples for Initial Selection: Manufacturer's color charts consisting of actual acoustical panels or sections of acoustical panels, suspension systems, and moldings showing the full range of colors, textures, and patterns available for each type of ceiling assembly indicated.

Delete paragraph above if colors and other characteristics are preselected and specified or scheduled. Retain paragraph below with or without above.

Samples for Verification: Full-size units of each type of ceiling assembly indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.

6-inch- (150-mm-) square samples of each acoustical panel type, pattern, and color.

Delete subparagraph above or below. Size of panels makes requirement below impractical.

Full-size samples of each acoustical panel type, pattern, and color.

Set of 12-inch- (300-mm-) long samples of exposed suspension system members, including moldings, for each color and system type required.

Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

Product Test Reports: Indicate compliance of acoustical panel ceilings and components with requirements based on comprehensive testing of current products.

Insert specific model code organization below or revise if report must be from another source.

Research/Evaluation Reports: Evidence of acoustical panel ceiling's and components' compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

QUALITY ASSURANCE

Installer Qualifications: Engage an experienced installer who has completed acoustical panel ceilings similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

Source Limitations for Ceiling Units: Obtain each acoustical ceiling panel from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

Source Limitations for Suspension System: Obtain each suspension system from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

Generally delete subparagraph below unless ceiling units will fit only the same manufacturer's suspension system. Armstrong and USG Interiors offer both suspension systems and ceiling units.

Obtain both acoustical ceiling panels and suspension system from the same manufacturer.

Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

Revise subparagraph below if only assemblies tested by one or more specifically named testing and inspecting agencies are acceptable.

Fire-response tests were performed by UL, ITS/Warnock Hersey, or another independent testing and inspecting agency that is acceptable to authorities having jurisdiction and that performs testing and follow-up services.

Revise subparagraph below if selecting Class B materials. Class B units are those with flame spread not exceeding 75 on face side.

Surface-burning characteristics of acoustical panels comply with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

Delete subparagraphs below if no fire-resistance-rated assemblies are required. Indicate rating, testing agency, and testing agency's design designation on Drawings. Revise subparagraph below to correlate with names of testing agencies in first subparagraph above.

Fire-resistance-rated assemblies, which are indicated by design designations from UL's "Fire Resistance Directory," from ITS/Warnock Hersey's "Directory of Listed Products," or from the listings of another testing and inspecting agency, are identical in materials and construction to those tested per ASTM E 119.

Products are identified with appropriate markings of applicable testing and inspecting agency.

Delete paragraph below if not required. If retaining, indicate location, size, and other details of mockups on Drawings or by inserts. Revise wording if only one mockup is required.

DELIVERY, STORAGE, AND HANDLING

Deliver acoustical panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.
PROJECT CONDITIONS
Limitations below are necessary for first-class results in many locations. Modify or delete for humidity-resistant products.
Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
COORDINATION
Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.
EXTRA MATERIALS
Extra materials may not be allowed for publicly funded projects.
Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
Revise below to suit Project. Replace percentage with a specific number of units and components required.

Acoustical Ceiling Units: Full-size units equal to 15.0 percent of amount installed.
Suspension System Components: Quantity of each exposed component equal to 15.0 percent of amount installed.
PRODUCTS
MANUFACTURERS
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment." see Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.
In lieu of using schedule at the end of Part 3, insert manufacturers' product designations and revise paragraph above or below to suit Project.
Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Acoustical Panel Ceiling Schedule at the end of Part 3.
ACOUSTICAL PANELS, GENERAL
Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.
Subparagraph below represents standard mounting referenced in ASTM e 1264. Revise if testing units with another mounting method is required for Project.

Mounting Method for Measuring Noise Reduction Coefficient: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.
Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

Retain subparagraph below only if patterns are exclusively specified by using ASTM e 1264 pattern designations.

Where appearance characteristics of acoustical panels are indicated by referencing ASTM E 1264 pattern designations and not manufacturers' proprietary product designations, provide products selected by Architect from each manufacturer's full range of products that comply with requirements indicated for type, pattern, color, light reflectance, acoustical performance, edge detail, and size.
Treatment below is available from armstrong world Industries and USG interiors for some panel products. If paragraph is retained, correlate with panel product characteristics in schedule. Delete if not needed or if treatment is not available for product selected.
Antimicrobial Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial solution consisting of a synergistic blend of substituted ammonium salts of alkylated phosphoric acids admixed with free alkylated phosphoric acid that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria.
Panel Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3, including those referencing ASTM E 1264 classifications.
In lieu of using schedule at the end of Part 3, insert manufacturers' product characteristics and revise "Acoustical Panel, General" Article to suit Project.
METAL SUSPENSION SYSTEMS, GENERAL
Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 requirements.
Metal Suspension System Characteristics: Comply with requirements indicated in the Acoustical Panel Ceiling Schedule at the end of Part 3.
In lieu of using schedule at the end of Part 3, insert manufacturers' product characteristics and revise "Metal Suspension Systems, General" Article to suit Project.
Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
Delete subparagraph below if not required. Finish is generally applicable to hot-dip galvanized steel with G60 or greater coating and aluminum systems with anodized finish. Show on Drawings where high-humidity finishes are required.
Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.
Subparagraph below does not apply to powder-actuated fasteners. Delete if no anchorage to concrete is required or if powder-actuated fasteners are acceptable. Verify safety factor with Project's structural engineer.
Delete subparagraph below if powder-actuated fasteners are not allowed. Verify safety factor with Project's structural engineer.

Postinstalled Fasteners: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that im-

posed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
Delete subparagraph above or below, unless both materials are required. If both are required, indicate location of each on Drawings. See Evaluations for discussion on corrosion resistance of hangers and fasteners. Revise hangers to strap type if required by authorities having jurisdiction or by local union regulations.
Nickel-Copper-Alloy Wire: ASTM B 164, nickel-copper-alloy UNS No. N04400.
Revise subparagraph below to 0.135 inch 3.5 mm if required by authorities having jurisdiction or if desired for extra security and quality (including corrosion allowance). Because larger sizes are difficult to work with, their use could result in poor leveling tolerance.
Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire, but provide not less than 0.106-inch- (2.69-mm-) diameter wire.
Delete hanger types below if not required. Insert sizes here or show on Drawings.
Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.
Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.
Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.
Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.
Revise subparagraphs below to suit Project and products selected; complement by showing profiles on Drawings.

For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.
Delete paragraph below if not required.
Delete paragraph below if not required. Indicate location on Drawings or describe by inserts.
ACOUSTICAL SEALANT
Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834 and the following requirements:

Product is effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

United States gypsum Co. Advertises that ITS acoustical sealant has flame-spread and smoke-developed ratings of less than 25 per ASTM e 84. Insert this requirement above if required for sealant by authorities having jurisdiction.
Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant recommended for sealing interior concealed joints to reduce airborne sound transmission.
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Products: Subject to compliance with requirements, provide one of the following:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Acoustical Sealant for Exposed and Concealed Joints:

PL Acoustical Sealant; Chemrex, Inc., Contech Brands.
AC-20 FTR Acoustical and Insulation Sealant; Pecora Corp.
SHEETROCK Acoustical Sealant; United States Gypsum Co.
EXECUTION
EXAMINATION
Examine substrates and structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage, and other conditions affecting performance of acoustical panel ceilings.

Proceed with installation only after unsatisfactory conditions have been corrected.
PREPARATION
Revise paragraph below to suit Project.
Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors whose installation is specified in other Sections.
Delete subparagraph below if not required.

Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.
Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
INSTALLATION
General: Install acoustical panel ceilings to comply with publications referenced below per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

Standard for Ceiling Suspension System Installations: Comply with ASTM C 636.
Verify requirements of authorities having jurisdiction as to which of the four subparagraphs below, if any, to reference.
Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E 580.

CISCA's Guidelines for Systems Requiring Seismic Restraint: Comply with CISCA's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies--Seismic Zones 3 & 4."
U.B.C.'s "Metal Suspension Systems for Acoustical Tile and for Lay-in Panel Ceilings": U.B.C. Standard 25-2.
Suspend ceiling hangers from building's structural members and as follows:

Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
Delete subparagraph above or below. Retain below only if fire-resistance-rated ceilings are selected.
Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure; that are appropriate for substrate; and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
Delete subparagraph above or below unless both types of hangers are required and their locations are indicated on Drawings or in this Section by inserts.
Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
Delete subparagraphs below that refer to inapplicable construction types. Revise subparagraph below if powder-actuated fasteners are not allowed.
Do not support ceilings directly from permanent metal forms or floor deck.
Revise subparagraph below if structural members are spaced too far apart for hangers and another method is required. For alternatives that may need to be detailed on Drawings, refer to cisca's guidelines.
Do not attach hangers to steel roof deck. Attach hangers to structural members.
Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; and provide hangers not more than 8 inches (200 mm) from ends of each member.
Paragraph below is based on requirements by office of State Architect in California for ceilings in hospitals and schools. Revise or delete if not required.
Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without

attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
Retain subparagraphs below to eliminate air movement, light leaks, and sound leaks at edges of ceiling.

Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m). Miter corners accurately and connect securely.
Delete subparagraph below or qualify if exposed fasteners are allowed.
Do not use exposed fasteners, including pop rivets, on moldings and trim.
Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
Install acoustical panels with undamaged edges and fitted accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
Delete subparagraph below if no directionally patterned panels are specified.

Arrange directionally patterned acoustical panels as follows:
Retain one of four subparagraphs below.

As indicated on reflected ceiling plans.Retain applicable subparagraphs below that correlate with panel edge details and suspension-system types specified in schedule.

Delete subparagraph below if all edges are concealed by suspension system flanges.
Paint cut panel edges remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

Delete below if no fire-resistance-rated assemblies.
Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.
Insert requirements for semiconcealed system (splined joints, etc.), if any.
Insert other field quality-control procedures required for Project.
CLEANING
Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
If applicable manufacturers' product designations and characteristics are inserted in Part 2, delete schedule Article below.
ACOUSTICAL PANEL CEILING SCHEDULE

Modify schedule or insert another to suit Project. Do not duplicate requirements in Section Text. Remove brackets [ ] and <Editor's Notes> after editing Schedule. Refer to Editing Instruction No. 2 and a completed example in the Evaluations for an explanation on how to use Schedules. Select one acoustical panel and one suspension system for each designated acoustical ceiling. Copy and re-edit appropriate sample paragraphs and subparagraphs below for each acoustical ceiling required. See editing instructions nos. 3 and 4 in the Evaluations.
Insert No. In place of [#] to complete designation for ceiling when selecting both panels and suspension system below. use this designation on drawings to show where each product is required.
Cast Mineral-Base Acoustical Panels for Acoustical Panel Ceiling:

Products:

a. Manufacturer: Armstrong Fissured 705A
b. Tile: 24” x 24” Tegular, square lay-in
c. Grid: Square Lay-I for 15/16” Exposed Tee System

END OF SECTION 09511

SECTION 09653 - RESILIENT WALL BASE AND ACCESSORIES

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes the following:

Adjust list below to suit Project. If only one type of product is required, revise Section number and title accordingly.

Resilient wall base.

SUBMITTALS

Product Data: For each type of product specified.

Samples for Initial Selection: Manufacturer's standard sample sets consisting of sections of units showing the full range of colors and patterns available for each type of product indicated.

Delete above if colors and other characteristics are preselected and specified or scheduled. Retain below with or without above.

QUALITY ASSURANCE

Installer Qualifications: Engage an experienced installer to perform work of this Section who has specialized in installing resilient products similar to those required for this Project and with a record of successful in-service performance.

Source Limitations: Obtain each type and color of product specified from one source with resources to provide products of consistent quality in appearance and physical properties without delaying the Work.

Delete below if not required by authorities having jurisdiction or if not available for products specified. See Editing Instruction No. 1 in the Evaluations before retaining.

Fire-Test-Response Characteristics: Provide products with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by a testing and inspecting agency acceptable to authorities having jurisdiction.

Critical Radiant Flux: 0.45 W/sq. cm or greater when tested per ASTM E 648.

Revise subparagraph above and below and insert other requirements to suit Project.

Smoke Density: Maximum specific optical density of 450 or less when tested per ASTM E 662.

DELIVERY, STORAGE, AND HANDLING

Deliver products to Project site in manufacturer's original, unopened cartons and containers, each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.

Store products in dry spaces protected from the weather, with ambient temperatures maintained between 50 and 90 deg F (10 and 32 deg C).

Revise conditioning period below to suit products selected.

Move products into spaces where they will be installed at least 48 hours before installation, unless longer conditioning period is recommended in writing by manufacturer.

PROJECT CONDITIONS
Revise maximum temperature and time periods in paragraph below to suit products selected.
Maintain a temperature of not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C) in spaces to receive resilient products for at least 48 hours before installation, during installation, and for at least 48 hours after installation, unless manufacturer's written recommendations specify longer time periods. After postinstallation period, maintain a temperature of not less than 55 deg F (13 deg C) or more than 95 deg F (35 deg C).
Do not install products until they are at the same temperature as the space where they are to be installed.
Delete paragraph below if not applicable.
For resilient products installed on traffic surfaces, close spaces to traffic during installation and for time period after installation recommended in writing by manufacturer.
Coordinate resilient product installation with other construction to minimize possibility of damage and soiling during remainder of construction period. Install resilient products after other finishing operations, including painting, have been completed.
EXTRA MATERIALS
Extra materials may not be allowed for publicly funded projects.
Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
Revise below to suit Project.

Furnish not less than 10 linear feet (3 linear m) for each 500 linear feet (150 linear m) or fraction thereof, of each different type, color, pattern, and size of resilient product installed.
Deliver extra materials to Owner.
PRODUCTS
MANUFACTURERS
Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, those indicated in the Resilient Wall Base and Accessory Schedule at the end of Part 3.
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment." See Editing Instruction No. 2 in the Evaluations.
In lieu of using schedule at the end of Part 3, insert acceptable manufacturers' product designations and revise paragraph above or below to suit Project.
Products: Subject to compliance with requirements, provide one of the products indicated for each designation in the Resilient Wall Base and Accessory Schedule at the end of Part 3.
RESILIENT WALL BASE
Retain applicable paragraphs below and correlate with schedule at the end of Part 3.
Rubber Wall Base: Products complying with resilient wall base and accessories section 3.5 of this specification section.
RESILIENT ACCESSORIES
Retain applicable paragraphs below and correlate with schedule at the end of Part 3.
Rubber Accessories: Products complying with requirements specified in the Resilient Wall Base and Accessory Schedule.
INSTALLATION ACCESSORIES

Revise paragraph below to suit Project. Use of gypsum-based formulations is not recommended by resilient product manufacturers.
Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based formulation provided or approved by resilient product manufacturer for applications indicated.
Delete paragraph below if not applicable.
Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

EXECUTION

EXAMINATION

Examine substrates, areas, and conditions where installation of resilient products will occur, with Installer present, for compliance with manufacturer's requirements, including those for maximum moisture content. Verify that substrates and conditions are satisfactory for resilient product installation and comply with requirements specified. Do not proceed with installation until unsatisfactory conditions have been corrected.

PREPARATION

More extensive surface preparation is required over substrates that have had existing resilient products removed from them. Requirements vary among manufacturers. Insert requirements to suit Project.
General: Comply with manufacturer's written installation instructions for preparing substrates indicated to receive resilient products.
Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
Delete paragraph below if not applicable.
Delete paragraph below if no concrete substrates.
Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
Broom and vacuum clean substrates to be covered immediately before installing resilient products. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Do not proceed with installation until unsatisfactory conditions have been corrected.

INSTALLATION

Retain installation procedures applicable to products selected. Insert other installation requirements to suit Project.
General: Install resilient products according to manufacturer's written installation instructions.
Revise paragraph and subparagraphs below to suit Project.
Apply resilient wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
Do not stretch base during installation.
Delete subparagraph below if not required or revise to suit Project.

Form outside corners on job, from straight pieces of maximum lengths possible, without whitening at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
Retain subparagraph above or below for job-formed corners, or delete both if premolded corners are specified exclusively. Correlate with schedule at the end of Part 3.
Form inside corners on job, from straight pieces of maximum lengths possible, by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.
Place resilient products so they are butted to adjacent materials and bond to substrates with adhesive. Install reducer strips at edges of flooring that would otherwise be exposed.
CLEANING AND PROTECTING
Perform the following operations immediately after installing resilient products:

Remove adhesive and other surface blemishes using cleaner recommended by resilient product manufacturers.
Sweep or vacuum horizontal surfaces thoroughly.
Do not wash resilient products until after time period recommended by resilient product manufacturer.
Damp-mop or sponge resilient products to remove marks and soil.
Protect resilient products against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during the remainder of construction period.
Use protection methods indicated or recommended in writing by resilient product manufacturer.
If desired, retain below for vinyl stair treads. Before retaining, verify manufacturers' recommendations for products selected. Generally, polishes are optional for vinyl treads. Polishes are not recommended for rubber treads.

Apply protective floor polish to vinyl resilient products installed on floors and stairs that are free from soil, visible adhesive, and surface blemishes, if recommended by manufacturer.

Use commercially available product acceptable to resilient product manufacturer.
Revise above and below to suit products selected.
Coordinate selection of floor polish with Owner's maintenance service.
Delete application of floor polish above or building paper below or both if not applicable. Correlate with manufacturers' recommendations for products selected.

Cover resilient products installed on floors and stairs with undyed, untreated building paper until inspection for Substantial Completion.
Final cleaning below is normally not work of this Section. Retain only if not covered in applicable Division 1 Section.
Clean resilient products not more than 4 days before dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products according to manufacturer's written recommendations.

Before cleaning, strip protective floor polish that was applied to vinyl products on floors and stairs after completing installation only if required to restore polish finish and if recommended by resilient product manufacturer.
Retain subparagraphs above and below only if polish is applied to vinyl treads after installation.
Revise above and below to suit products selected and Owner's planned maintenance program.
After cleaning, reapply polish on vinyl products on floors to restore protective floor finish according to resilient product manufacturer's written recommendations. Coordinate with Owner's maintenance program.
RESILIENT WALL BASE AND ACCESSORY SCHEDULE
Delete this Article if applicable manufacturers' product designations are inserted in Part 2.
Modify resilient wall base and accessory schedule to suit Project. Do not duplicate requirements in Section Text. Remove brackets [ ] AND <UPPERCASE EDITOR'S NOTES> AFTER EDITING SCHEDULE. REFER TO A COMPLETED EXAMPLE IN THE EVALUATIONS FOR AN EXPLANATION ON HOW TO USE SCHEDULES.
Insert No. In place of [#] to complete designation below. Use this designation on Drawings to show where this product is required.
Copy and re-edit appropriate sample paragraphs and subparagraphs below for each resilient product required.
Rubber Wall Base: Where designated, provide rubber wall base complying with the following:

Color and Pattern: Roppe 700 series or approved equal by others, color as selected by project manager to match existing building color.

Style: 4” straight edge at all locations
END OF SECTION 09653

Department of Safety
Richfield U.H.P. - I.T.S. Dispatch Modifications
Division of Facilities Construction Management

This Short Language Version (SLV) Section was condensed from the updated Basic Version Section of the same title and number. See Basic Section's Cover for changes from the previous edition of this Section.
Caution: Use SLV Sections for small, simple, private projects that are negotiated rather than bid; for projects limited to traditional materials and methods; and for projects where the Architect has reduced or no contract administration responsibilities.
See Basic Section's Text and Evaluations when editing this SLV Section. The Basic Section contains comprehensive notes and requirements plus a greater number of options.
This SLV Section includes tufted and woven carpet and carpet cushion.
SECTION 09680 - CARPET
GENERAL
Submittals: As follows:

Product Data for each type of product indicated.
Samples for each product required.
Product schedule using same room and product designations indicated on Drawings and in schedules.
Maintenance data for carpet to include in maintenance manuals specified in Division 1.
Delete paragraph below if products are not adhesively applied to concrete substrates. Revise to suit Project.
Extra Materials: Furnish 15 percent of amount installed, but not less than 10 sq. yd. (8.3 sq. m).
PRODUCTS
Carpet : **Interface Entropy**
Revise subparagraph below if colors and patterns are preselected and inserted with product designations above.

Color and Pattern: As selected by Project manager
Delete subparagraph below if proprietary fiber types such as antron, ultron, or zeftron are not inserted.

Pattern Loop	Looped or Looped Pile	
	Fiber Brand:	Antron Lumina
	Dye Method:	Solution Dye
	Adhesive:	Series 2000 Re-attachable
	Protective Treatment:	Protect
	Primary Backing:	Synthetic Back
	Pile Weight:	20 oz/ sq.yd.
	Pile Thickness:	.143”
	Density:	5035
	Gauge:	12”
	Flaming Mode:	(ASTM E-648):
	Smoke Density:	ASTM E 662 – Less than 450

Warranty: As per State Requirements

Insert other performance characteristics, such as static resistance, to suit Project.
EXECUTION
Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.
Retain subparagraph below if products are adhesively attached to concrete subfloors.

Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and slabs are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by **carpet manufacturer**
Delete subparagraph below if no wood subfloors.
Preparation: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.
Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.
Retain paragraph below if products are adhesively attached to concrete substrates.
Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents.
Comply with carpet manufacturer's written recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
Install pattern as per manufactures recommendations
Retain paragraph below for stretch-in installations.
Perform the following operations immediately after installing carpet:

Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
Remove yarns that protrude from carpet surface.
Vacuum carpet using commercial machine with face-beater element.
Protect installed carpet to comply with CRI 104, Section 15, "Protection of Indoor Installations."
END OF SECTION 09680

SECTION 09900 - PAINTING

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes surface preparation and field painting of the following:

Adjust list below to suit the Project.

Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

Delete subparagraph below if painting of mechanical and electrical components is specified in Divisions 15 and 16.

Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work, and primed metal surfaces of mechanical and electrical equipment.

Revise paragraph below to suit the Project.

Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

Prefinished items include the following factory-finished components:

Review list of prefinished items below. Delete items not in the Project. Insert additional items to suit the Project.

Finished mechanical and electrical equipment.
Light fixtures.
Distribution cabinets.
Aluminum window frames and doors

Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

Review list of spaces below that contain concealed surfaces not usually painted. Delete spaces not in the Project. Insert additional spaces to suit the Project.

Foundation spaces.
Furred areas.
Ceiling plenums.
Utility tunnels.

Pipe spaces.
Duct shafts.

Finished metal surfaces include the following:
Review list of prefinished metals below. Delete metals not in the Project. Insert additional metals to suit the Project.

Anodized aluminum.
Stainless steel.
Chromium plate.
Copper.
Bronze and brass.

Operating parts include moving parts of operating equipment and the following:
Review list of operating parts below. Delete any items not in the Project. Insert additional operating parts to suit the Project.

Valve and damper operators.
Linkages.
Sensing devices.
Motor and fan shafts.

Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
Related Sections include the following:
List below contains items that are usually shop primed and materials that might be specified in this Section. Revise to suit the Project. Verify that Section titles listed below are correct for this Project's Specifications.

Division 8 Section "Steel Doors and Frames" for shop priming steel doors and frames.
Division 9 Section "Gypsum Board Assemblies" for surface preparation for gypsum board.
Retain subparagraph below if painting of mechanical and electrical work is specified in Divisions 15 and 16.
Retain below if alternate is specified in Division 1 for work in this Section.
If allowances or unit prices apply to work of this Section, insert brief paragraphs here to alert the Contractor and reference the appropriate Division 1 Section for specific details.
DEFINITIONS
Standard terms used by the coatings industry are defined in ASTM D 16.
General: Standard coating terms defined in ASTM D 16 apply to this Section.
Delete gloss ranges below not required for the Project. Standard gloss ranges were developed by the National Paint and Coatings Association (NPCA).

Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
Eggshell refers to low-sheen finish with a gloss range between 5 and 20 when measured at a 60-degree meter.

Satin refers to low-sheen finish with a gloss range between 15 and 35 when measured at a 60-degree meter.
Semigloss refers to medium-sheen finish with a gloss range between 30 and 65 when measured at a 60-degree meter.
Full gloss refers to high-sheen finish with a gloss range more than 65 when measured at a 60-degree meter.
SUBMITTALS
Expand paragraph and subparagraphs below to suit the Project and products required.
Product Data: For each paint system specified. Include block fillers and primers.

Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.
Delete subparagraph below if the local jurisdiction does not regulate use of volatile organic compounds (VOC's). The number of states and local jurisdictions regulating or restricting the use of coatings with high VOC content is expected to increase over the next few years. See the Evaluations for further discussion.
Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
Revise paragraph below if colors are preselected and specified or scheduled.
Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
Revise subparagraph below if the Architect reserves the right to make final color selection from field-applied Samples.

After color selection, the Architect will furnish color chips for surfaces to be coated.
Retain below with or without above.
Samples for Verification: Of each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.
Provide a list of materials and applications for each coat of each sample. Label each sample for location and application.
Submit Samples on the following substrates for the Architect's review of color and texture only:
Select sample Submittals from list below to suit substrates in the Project. Add other substrates or special requirements to suit the Project.
Stained or Natural Wood: Provide two 4-by-8-inch (100-by-200-mm) samples of natural- or stained-wood finish on actual wood surfaces.

Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
QUALITY ASSURANCE
Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
Always retain paragraph below. Systems could fail if coats are incompatible.
Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.
Requirements in paragraph and subparagraphs below can become expensive if not carefully specified. Delete on small projects and on simple projects where such requirements are unreasonable. Retain on large projects and when the applicator must possess special skills or take unusual care in the application. Revise to suit special circumstances and unusual Project conditions.
Revise subparagraph below if the Architect reserves the right to make final color selection from field-applied Samples.
DELIVERY, STORAGE, AND HANDLING
Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
Add other requirements to suit the Project.

Product name or title of material.
Product description (generic classification or binder type).
Manufacturer's stock number and date of manufacture.
Contents by volume, for pigment and vehicle constituents.
Thinning instructions.
Application instructions.
Color name and number.
VOC content.
Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain containers used in storage in a clean condition, free of foreign materials and residue.

Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.
Add special requirements for fire protection, heating, ventilation, and other special conditions for storage areas on-site, if necessary.
PROJECT CONDITIONS
Revise 2 paragraphs below to suit the Project requirements and materials to be used.
Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50 and 90 deg F (10 and 32 deg C).
Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45 and 95 deg F (7.2 and 35 deg C).

Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.
Retain subparagraph below for projects that require only limited quantities of extra materials. If necessary, replace percentage with a specific number of gallons or cases and include an expanded description of the quantity of each material and color.
PRODUCTS
MANUFACTURERS
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:
Manufacturers listed in paint schedules produce an extensive line of nationally distributed paint products that are usually available locally. Add local and regional paint manufacturers, if desired. Edit the schedules to suit the Project and local product availability. See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Devoe & Raynolds Co. (Devoe).
Fuller-O'Brien Paints (Fuller).
Glidden Co. (The) (Glidden).
Benjamin Moore & Co. (Moore).
PPG Industries, Inc. (PPG).
Pratt & Lambert, Inc. (P & L).
Sherwin-Williams Co. (S-W).
Kwal-Howells
Others as pre-approved.
PAINT MATERIALS, GENERAL
Always retain paragraph below. Systems could fail if coatings are incompatible.
Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
Delete subparagraph below if Project requirements prohibit naming manufacturer's products.

Proprietary Names: Use of manufacturer's proprietary product names to designate colors or materials is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions.
Retain 1 of 3 paragraphs below.

Indicate paint colors in a separate schedule or show location and extent on the Drawings. The number of colors used on a Project and use of deep-tone colors will impact Project cost. See the Evaluations for discussion on the number of colors.

EXECUTION

EXAMINATION

Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

Coordinate primers specified in other Sections with undercoats and finish materials specified in this Section to ensure compatibility of materials. Some finish-coat materials, such as lacquers and epoxies, lift oil and oleoresinous air-dry primers. A long-oil finish coat may crawl and have poor adhesion when used over zinc-dust phenolic or baked primers.

Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

PREPARATION

Expand paragraph and subparagraph below if additional requirements are necessary to satisfy unusual Project circumstances.

General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.

After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

Always retain paragraph and subparagraphs below that specify surface preparation. Proper surface preparation is essential for satisfactory coating performance. Expand requirements, if necessary, to include special procedures requested by manufacturers or to satisfy special Project conditions.

Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

Coordination of shop-applied primers with finish coats is critical. See the "Coordination of Work" Paragraph in the "Examination" Article. If compatibility problems develop, it may be necessary to provide barrier coats over shop-applied primers or remove the primer and reprime the substrate.

Provide barrier coats over incompatible primers or remove and reprime.

Delete subparagraphs below if cementitious surfaces are not to be painted, or revise to suit the Project.
Delete subparagraphs below if wood surfaces are not to be painted, or revise to suit the Project.
Revise subparagraphs below to suit the Project.

Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
Delete subparagraph below if blast cleaning is not required. SSPC-SP 10 requires a higher level of preparation than is often justified. Reduce preparation level to SSPC-SP 6 if warranted.

Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.
Delete subparagraph below if treatment is not required.
Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
Delete subparagraph below if touchup painting of shop-applied primers will be done by the material erector or Installer.
Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
Use only thinners approved by paint manufacturer and only within recommended limits.
If tinting is not required, delete paragraph below. Different tints will show through as the topcoat erodes.
Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.
APPLICATION
Revise this Article to suit the Project. Add special restrictions on application methods, if required.
General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
Provide finish coats that are compatible with primers used.
The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
Delete subparagraph below if casework is prefinished.
Sand lightly between each succeeding enamel or varnish coat.
Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
Insert restrictions or limits on use of spray equipment if necessary to suit special Project conditions.

The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
Omit primer on metal surfaces that have been shop primed and touchup painted.
If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.
Revise paragraph below if the Owner's requirements or other special Project conditions restrict or limit use of spray equipment for paint application. Some owners prohibit or restrict the use of spray on their projects. Spray application of paints can damage sensitive electronic operating equipment and might cause problems for personnel in occupied buildings.
Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
Paragraph below is an example of painting requirements for mechanical and electrical work. Delete if painting of mechanical and electrical equipment is specified in Divisions 15 and 16, or revise to suit the Project.
Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.
finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
Delete finishes below if none is in the Project. Indicate locations in the finish schedules.
Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

Provide satin finish for final coats.
Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
FIELD QUALITY CONTROL
Retain this Article for large projects where controls may be less than desired. Delete if not required.
The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during the period when paint is being applied:

The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.
The testing agency will perform appropriate tests for the following characteristics as required by the Owner:
Review list of characteristics below; delete unnecessary requirements. Insert other tests as needed to suit the Project.

Quantitative material analysis.
Abrasion resistance.
Apparent reflectivity.
Flexibility.
Washability.
Absorption.
Accelerated weathering.
Dry opacity.
Accelerated yellowness.

Recoating.
Skinning.
Color retention.
Alkali and mildew resistance.

The Owner may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.
CLEANING
Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
Delete subparagraph below if final cleaning is not done by the painter.

After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.
PROTECTION
Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting.
Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.
Use the schedules below as guides only. See the Evaluations for further discussion. Products listed in the schedules have been researched and evaluated and are believed to be comparable to products of other manufacturers listed. However, due to differences between different manufacturers' individual product formulas, some products listed may have some advantages or disadvantages when compared to similar products of other manufacturers. Base final product selection on coating performance characteristics required.
Retain the paint system below for a full-gloss, alkyd-enamel finish over exterior ferrous metal subject to normal use and moderate environments.
Retain the paint system below for a full-gloss, waterborne, low-VOC, acrylic-enamel finish on exterior zinc-coated metal subject to normal use and moderate environments.
INTERIOR PAINT SCHEDULE
See Editing Instructions No. 2 through 6 in the Evaluations for guidance before starting to edit the schedule below. The schedule below includes examples of paint systems for different interior substrates. Retain only the substrates and paint systems suitable for the Project.
Low-luster (eggshell or satin), semigloss, and full-gloss enamel finishes are seldom used over mineral-fiber-reinforced cement panels and shingles on the interior. Consult manufacturers for suitable systems before specifying these finishes.
Gypsum Board: Provide the following finish systems over interior gypsum board surfaces where designated by architect:

Retain the paint system below for a flat acrylic finish over interior gypsum board wall and ceiling surfaces subject to normal use and moderate environments.
Revise subparagraph below for products that require only one finish coat over a primer.

Low-Luster, Acrylic-Enamel Finish: 2 finish coats over a primer.

Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 50801 Wonder-Tones Interior Vinyl Latex Primer-Sealer.
Fuller: 220-20 Pro-Tech Interior Latex Wall Primer and Sealer.
Glidden: 5111 Spred Ultra Latex Primer-Sealer.
Moore: Regal First Coat Interior Latex Primer & Underbody #216.
PPG: 17-10 Quick-Drying Interior Latex Primer-Sealer.
P & L: Z/F 1004 Suprime "4" Interior Latex Wall Primer.
Kwal-Howells: 0880 Latex Sealer
Revise subparagraph below for products that require only one finish coat over a primer.

First and Second Coats: Low-luster (eggshell or satin), acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.8 mils (0.071 mm).

Devoe: 34XX Wonder-Tones Interior Latex Eggshell Enamel.
Fuller: 212-XX AA Enamel Acrylic Latex Eggshell Enamel.
Glidden: 4100 Series Spred Ultra Eggshell Latex Wall & Trim Paint.
Moore: Moore's Regal AquaVelvet #319.
PPG: 89 Line Manor Hall Eggshell Latex Wall and Trim Enamel.
P & L: Z/F 4000 Series Accolade Interior Velvet.
Kwal-Howells: 1902 Latex Low Sheen Enamel
Retain the paint system below for an acrylic-latex-based, semigloss enamel finish over interior gypsum board wall and ceiling surfaces subject to normal use and moderate environments. This finish is an alternative to solvent-based, semigloss enamels.

Semigloss, Acrylic-Enamel Finish: 2 finish coats over a primer.

Primer: Latex-based, interior primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 50801 Wonder-Tones Interior Vinyl Latex Primer-Sealer.
Fuller: 220-20 Pro-Tech Latex Wall Primer Sealer, White.
Glidden: 5111 Spred Ultra Latex Primer-Sealer.
Moore: Regal First Coat Interior Latex Primer & Underbody #216.
PPG: 17-10 Quick-Drying Interior Latex Primer-Sealer.
P & L: Z/F 1001 Suprime "1" 100 Percent Acrylic Multi-Purpose Primer.
Kwal-Howells: 0880 Latex Sealer

Revise subparagraph below for products that require only one finish coat over a primer.

First and Second Coats: Semigloss, acrylic-latex, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 2.6 mils (0.066 mm).

Devoe: 39XX Wonder-Tones Semi-Gloss Interior Latex Enamel.
Fuller: 214-XX AA Enamel Interior Acrylic Latex Semi-Gloss Enamel.
Glidden: 8200 Series Spred Ultra Latex Semi-Gloss Enamel.
Moore: Moore's Regal AquaGlo Vinyl-Acrylic Latex Enamel #333.
PPG: 88-110 Satinhide Interior Enamel Wall & Trim Lo-Lustre Semi-Gloss Latex.
P & L: Z/F 4100 Series Accolade Interior Semi-Gloss.
Kwal-Howells: 2900 Acrylic Enamel
Retain the paint system below for a semigloss, low-odor, alkyd-enamel finish over interior gypsum board wall and ceiling surfaces subject to normal use and moderate environments.
Because full-gloss finishes highlight imperfect joint treatment, they are usually used over gypsum board surfaces only on projects that require frequent cleaning, such as hospitals and nursing homes. Specify a Level 5 finish on gypsum board and construction of a mockup before installation to minimize surface problems if a full-gloss finish is required.
Retain the paint system below for a full-gloss, acrylic-enamel finish over interior gypsum board wall and ceiling surfaces subject to normal use and moderate environments. This finish is an alternative to solvent-based, full-gloss enamels.
Retain the finish system below for a waterborne, full-gloss, varnish finish over interior woodwork. Revise the finish system to suit products selected for the Project. This finish is a water-based alternative to solvent-based finishes. Fuller-O'Brien, Glidden, and Sherwin-Williams do not currently produce a product that matches this system.
Retain the finish system below for a wax-polished finish over interior woodwork finish subject to normal use and moderate environments.
Ferrous Metal: Provide the following finish systems over ferrous metal:
Retain the paint system below for a flat acrylic finish over interior ferrous metal subject to normal use and moderate environments.
Retain the paint system below for an acrylic-latex-based, semigloss enamel finish over interior ferrous metal subject to normal use and moderate environments. This finish is an alternative to solvent-based, semigloss enamels.
Some manufacturers recommend using 2 finish coats over a primer instead of a primer followed by an enamel undercoater and one finish coat. Revise subparagraph and systems below, if necessary, to suit products recommended by manufacturers selected.
Retain the paint system below for a semigloss, alkyd-enamel finish over interior ferrous metal subject to normal use and moderate environments.
Some manufacturers recommend using 2 finish coats over a primer instead of a primer followed by an enamel undercoater and one finish coat. Revise subparagraph and systems below, if necessary, to suit products recommended by manufacturers selected.

Semigloss, Alkyd-Enamel Finish: One finish coat over an enamel undercoater and a primer.

Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).

Devoe: 13101 Mirrolac Rust Penetrating Metal Primer.
Fuller: 621-04 Blox-Rust Alkyd Metal Primer.
Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
Moore: IronClad Retardo Rust-Inhibitive Paint #163.
PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
P & L: S 4551 Tech-Gard High Performance Rust Inhibitor Primer.
S-W: Kem Kromik Metal Primer B50N2/B50W1.

Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
Fuller: 220-07 Interior Alkyd Enamel Undercoat.
Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
Moore: Moore's Alkyd Enamel Underbody #217.
PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
P & L: S/D 1011 Suprime "11" Interior Alkyd Wood Primer.
S-W: ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200.

Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).

Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
Fuller: 110-XX Fullerglo Alkyd Semi-Gloss Enamel.
Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
Moore: Satin Impervo #235.
PPG: 27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil.
P & L: S/D 5700 Cellu-Tone Alkyd Satin Enamel.
S-W: Classic 99 Interior/Exterior Semi-Gloss Alkyd Enamel A-40 Series.
Retain the paint system below for an acrylic-latex-based, full-gloss enamel finish over interior ferrous metal subject to normal use and moderate environments. This finish is an alternative to solvent-based, full-gloss enamels.
Retain the paint system below for a full-gloss, alkyd-enamel finish over interior ferrous metal subject to normal use and moderate environments.
Some manufacturers recommend using 2 finish coats over a primer instead of a primer followed by an enamel undercoater and one finish coat. Revise subparagraph and systems below, if necessary, to suit products recommended by manufacturers selected.

Full-Gloss, Alkyd-Enamel Finish: 2 finish coats over an enamel undercoater and a primer.

Primer: Quick-drying, rust-inhibitive, alkyd-based or epoxy-metal primer, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.5 mils (0.038 mm).

Devoe: 13101 Mirrolac Rust Penetrating Metal Primer.
Fuller: 621-04 Blox-Rust Alkyd & Structural Metal Primer.
Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
Moore: IronClad Retardo Rust-Inhibitive Paint #163.
PPG: 6-208 Speedhide Interior/Exterior Rust Inhibitive Steel Primer.
P & L: S 4551 Tech-Gard High Performance Rust Inhibitor Primer.
S-W: Kem Kromik Metal Primer B50N2/B50W1.

Undercoat: Alkyd, interior enamel undercoat or full-gloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
Fuller: 220-07 Interior Alkyd Enamel Undercoat.
Glidden: 4500 Series Glid-Guard Alkyd Industrial Enamel.
Moore: Moore's Alkyd Enamel Underbody #217.
PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
P & L: S/D 1001 Suprime "11" Interior Alkyd Wood Primer.
S-W: Industrial Enamel B-54 Series.

Finish Coat: Full-gloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
Fuller: 312-XX EPA Compliant Heavy-Duty Enamel.
Glidden: 4500 Series Glid-Guard Alkyd Industrial Enamel.
Moore: Impervo Enamel #133.
PPG: 54 Line Pittsburgh Paints Gloss-Oil Interior/Exterior Enamels.
P & L: S/D 1100 Series Effecto Enamel.
S-W: Industrial Enamel B-54 Series.
Zinc-Coated Metal: Provide the following finish systems over zinc-coated metal:
Retain the paint system below for a flat acrylic finish over interior galvanized metal subject to normal use and moderate environments.
Retain the paint system below for a low-luster (eggshell or satin), acrylic-enamel finish over interior galvanized metal subject to normal use and moderate environments.
Retain the paint system below for an acrylic-latex-based, semigloss enamel finish over interior galvanized metal subject to normal use and moderate environments. This finish is an alternate to solvent-based, semigloss enamels.
Retain the paint system below for a semigloss, alkyd-enamel finish over interior galvanized metal subject to normal use and moderate environments.

Some manufacturers recommend using 2 finish coats over a primer instead of a primer followed by an enamel undercoater and one finish coat. Revise subparagraph and systems below, if necessary, to suit products recommended by manufacturers selected.

Semigloss, Alkyd-Enamel Finish: One finish coat over an undercoat and a primer.

Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 13201 Mirrolac Galvanized Metal Primer.
Fuller: 621-05 Blox-Rust Latex Metal Primer.
Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
Moore: IronClad Galvanized Metal Latex Primer #155.
PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
P & L: Z/F 1003 Suprime "3" Interior/Exterior Latex Metal Primer.
S-W: Galvite Paint B50W3.

Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
Fuller: 220-07 Interior Alkyd Enamel Undercoat.
Glidden: UH 8400 Series Spred Ultra Traditional Alkyd Semi-Gloss Enamel.
Moore: Moore's Alkyd Enamel Underbody #217.
PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
P & L: S/D 1011 Suprime "11" Interior Alkyd Wood Primer.
S-W: ProMar 200 Interior Alkyd Semi-Gloss Enamel B34W200.

Finish Coat: Odorless, semigloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.4 mils (0.036 mm).

Devoe: 26XX Velour Interior Alkyd Semi-Gloss Enamel.
Fuller: 110-XX Fullerglo Alkyd Semi-Gloss Enamel.
Glidden: UH 8400 Ultra Traditional Alkyd Semi-Gloss Enamel.
Moore: Satin Impervo #235.
PPG: 27 Line Wallhide Low Odor Interior Enamel Wall and Trim Semi-Gloss Oil.
P & L: S/D 5700 Cellu-Tone Alkyd Satin Enamel.
S-W: Classic 99 Interior Alkyd Semi-Gloss Enamel A-40 Series.
Retain the paint system below for an acrylic-latex-based, full-gloss enamel finish over interior galvanized metal subject to normal use and moderate environments. This finish is an alternative to solvent-based, full-gloss enamels.
Retain the paint system below for a full-gloss, alkyd-enamel finish over interior galvanized metal subject to normal use and moderate environments.

Some manufacturers recommend using 2 finish coats over a primer instead of a primer followed by an enamel undercoater and one finish coat. Revise subparagraph and systems below, if necessary, to suit products recommended by manufacturers selected.

Full-Gloss, Alkyd-Enamel Finish: One finish coat over an enamel undercoater and a primer.

Primer: Galvanized metal primer applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 13201 Mirrolac Galvanized Metal Primer.
Fuller: 621-05 Blox-Rust Latex Metal Primer.
Glidden: 5207 Glid-Guard Tank & Structural Primer, White.
Moore: IronClad Galvanized Metal Latex Primer #155.
PPG: 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel.
P & L: Z/F 1003 Suprime "3" Interior/Exterior Latex Metal Primer.
S-W: Galvite Paint B50W3.

Undercoat: Alkyd, interior enamel undercoat or semigloss, interior, alkyd-enamel finish coat, as recommended by the manufacturer for this substrate, applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
Fuller: 220-07 Interior Alkyd Enamel Undercoat.
Glidden: 4500 Series Glid-Guard Alkyd Industrial Enamel.
Moore: Moore's Alkyd Enamel Underbody #217.
PPG: 6-6 Speedhide Interior Quick-Drying Enamel Undercoater.
P & L: S/D 1001 Suprime "11" Interior Alkyd Wood Primer.
S-W: Industrial Enamel B-54 Series.

Finish Coat: Full-gloss, alkyd, interior enamel applied at spreading rate recommended by the manufacturer to achieve a total dry film thickness of not less than 1.2 mils (0.031 mm).

Devoe: 70XX Mirrolac Interior/Exterior Alkyd-Urethane Gloss Enamel.
Fuller: 312-XX EPA Compliant Heavy-Duty Enamel.
Glidden: 4500 Series Glid-Guard Alkyd Industrial Enamel.
Moore: Impervo Enamel #133.
PPG: 54 Line Pittsburgh Paints Gloss-Oil Interior/Exterior Enamel.
P & L: S/D 1100 Series Effecto Enamel.
S-W: Industrial Enamel B-54 Series.
END OF SECTION 09900

DIVISION 12
BLINDS

12511 HORIZONTAL LOUVER BLINDS

SECTION 12511 - HORIZONTAL LOUVER BLINDS

This Section uses the term Architect. Change this term as necessary to match the actual term used to identify the design professional as defined in the General and Supplementary Conditions.

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

This Section includes venetian blinds.

If alternates, allowances, or unit prices apply to work of this Section, insert brief paragraphs here to alert the Contractor and reference the appropriate Division 1 Section for specific details.

SUBMITTALS

General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

Product data for each type of horizontal louver blind specified. Include printed data on physical characteristics.

Shop drawings showing location and extent of blinds. Show installation details at and relationship to adjoining work. Include elevations indicating blind units. Indicate location of blind controls.

Select from 2 paragraphs below. Use first paragraph if allowances are used. Use second paragraph with a Product Data sheet for proprietary Specification. Modify below for custom-color louvers.

Samples for initial selection in the form of manufacturer's color charts showing the full range of colors, textures, and patterns available for each type of horizontal louver blind indicated.

Delete above if colors, etc., are preselected and specified or scheduled. Retain below with or without above.

Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare samples from the same material to be used for the Work.

Retain below for custom-color louvers.

Louver: Manufacturer's standard-size unit, not less than 12 inches (300 mm) long.

Retain below if valance is different color than louvers.

Valance: Manufacturer's standard-size unit, not less than 12 inches (300 mm) long.

Schedule of horizontal louver blinds using same room designations indicated on Drawings.

Maintenance data for horizontal louver blinds to include in the operation and maintenance manual specified in Division 1. Include the following:

Methods for maintaining horizontal louver blinds and finishes.

Precautions for cleaning materials and methods that could be detrimental to finishes and performance.

QUALITY ASSURANCE

Fire-Test-Response Characteristics: Provide horizontal louver blinds identical to those tested for the following fire-test-response characteristics as determined by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
Retain below or insert appropriate test for jurisdiction.

Test Method: NFPA 701.
Rating: Pass.
Retain below if blinds are electrically operated.
Single-Source Responsibility: Obtain each type of horizontal louver blind from one source and by a single manufacturer.
Delete below if not required. If retained, indicate location, size, and other details of mockups on Drawings or by inserts.
Consider requiring mockups for perforated blinds.
PROJECT CONDITIONS
Field Measurements: Check actual horizontal louver blind dimensions by accurate field measurements before fabrication, and show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
Space Enclosure and Environmental Limitations: Do not install horizontal louver blinds until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
EXTRA MATERIALS
Extra materials may not be allowed for publicly funded work.
Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
Retain or revise below to replace percentage with actual number of units and components required.

Horizontal Louver Blinds: Before installation begins, furnish quantity of full-size units equal to 5 percent of amount of each size installed.
PRODUCTS
MANUFACTURERS
See Editing Instructions No. 2 through No. 4 in the Evaluations before editing this and subsequent articles. These instructions include 2 distinct methods of specifying horizontal louver blinds. The first set of paragraphs and accompanying lists are for specifying blinds without using Product Data sheets. The second set is for specifying horizontal louver blinds using Product Data sheets. Delete first set of paragraphs and manufacturers' list if using Product Data sheets.
Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment."
Manufacturers: Subject to compliance with requirements, provide products by one of the following:
See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.

Horizontal Louver Blinds:

Eastern Standard Corp.
Faber.
Hunter Douglas, Inc.
Joanna Western Mills Co.
Kirsch.
Levolor Corp.
Louverdrape, Inc.
Nanik.
Springs Window Fashions Division, Inc.; (Bali-Graber).
Verosol USA, Inc.
Delete both paragraphs below if Product Data sheets are not used to specify blinds. If using Product Data sheets, delete preceding paragraphs, including manufacturers' lists, and complete the Product Data sheets at the end of this Section. See Editing Instruction No. 4 and other explanations in the Evaluations about using Product Data sheets.
Available Products: Subject to compliance with requirements, horizontal louver blinds that may be incorporated in the Work include, but are not limited to, the products specified in each Product Data sheet at the end of this Section.
Retain above for nonproprietary or below for semiproprietary Specification. Refer to Division 1 Section "Materials and Equipment." Delete both if no products are named in Product Data sheets. See Editing Instruction No. 1 in the Evaluations for cautions about naming products and manufacturers.
Products: Subject to compliance with requirements, provide one of the products specified in each Product Data sheet at the end of this Section.
HORIZONTAL LOUVER BLINDS
Louvers: Manufacturer's standard as follows:

Retain 1 of 4 below. Eastern Standard Corp. is the only listed manufacturer that fabricates steel louvers. Nanik is the only listed manufacturer that fabricates transparent vinyl louvers.
Aluminum.Verify Nominal
Nominal Louver Width: 2 inch (25 mm) (miniblinds).
Tilt Operation: Manual with wand.
If top-locking, cord-lock blinds are improperly operated, ring pull prevents blind from dropping and damaging itself or sill.
Cord-Lock Operation: Top-locking cord lock; locks pull cord to stop blind in either fully opened or fully closed position only and is equipped with a ring pull not more than 10 inches (250 mm) long.
Delete below if right position for cord lock specified in AWCMA standard is acceptable; correlate with tilt-control position above.

Position of Cord Lock: Right side, unless otherwise indicated.
Cord Equalizers: Self-aligning to maintain horizontal louver blind position.
Revise below if different color is required.
Valance: Match color of louvers.

Mounting: End.
Delete below if Architect reserves the right to select from manufacturer's full color range at a later date.
Colors and Patterns: Where manufacturer's standard products are indicated, provide horizontal louvers complying with the following requirements:

Retain one requirement from choices below. If retaining second requirement, indicate colors or patterns on a separate schedule. Modify below if colors on convex and concave sides of louvers are different.
Provide Architect's selections from manufacturer's full range of colors and patterns for horizontal louver blinds of type indicated.
FABRICATION
Below is minimum standard. Many manufacturers' products exceed performance levels of this standard. Blinds manufactured outside the U.S. may not meet this standard.
Product Standard and Description: Comply with AWCMA Document 1029 for each horizontal louver blind unit consisting of louvers, rails, cord locks, tilting mechanisms, tapes, and installation hardware.
Lifting and Tilting Mechanisms: Noncorrosive, self-lubricating materials.
Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

Blind Units Installed Between (Inside) Jambs: Width equal to 1/4 inch (6 mm) per side or 1/2 inch (12 mm) total, plus or minus 1/8 inch (3 mm), less than jamb to jamb dimension of opening in which each blind is installed. Length equal to 1/4 inch (6 mm), plus or minus 1/8 inch (3 mm), less than head to sill dimension of opening in which each blind is installed.
Delete above or below if not applicable.
Delete below if blinds are manually operated. Blind size and quantity of blind units operated by same motor are limited. Verify with manufacturer. Hunter Douglas is the only listed manufacturer that provides their own motors.
Installation Fasteners: Not less than 2 fasteners per bracket, fabricated from metal noncorrosive to blind hardware and adjoining construction; support blind units under conditions of normal use.
Retain, revise, or delete below as required.
Hold-Down Brackets: Manufacturer's standard, as indicated.
Retain, revise, or delete below as required. Side channels reduce light leakage at blind edge.
Side Channels: Manufacturer's standard, as indicated.
EXECUTION
EXAMINATION
Examine substrates, areas, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of horizontal louver blinds. Do not proceed with installation until unsatisfactory conditions have been corrected.
INSTALLATION
Coordinate requirements for distance between blinds and glass with glass type to avoid heat build-up and possible damage to glass.
Install blinds level, plumb, and located so exterior louver edges in any position are not closer than 1 inch (25 mm) to interior face window frame.

Retain 1 of 3 below, or delete all if mounting is shown on Drawings.
Jamb Mounted: Install headrail flush with face of opening jamb and head.
ADJUSTING
Adjust components and accessories for proper operation.
CLEANING
Clean blind surfaces, according to manufacturer's instructions, after installation.
Remove surplus materials, packaging, rubbish, and debris resulting from installation. Leave installation areas neat, clean, and ready for use.
PROTECTION
Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensure that horizontal louver blinds are without damage or deterioration at the time of Substantial Completion.
HORIZONTAL LOUVER BLIND SCHEDULE
Delete this Article if schedule is not included as part of this Section. See sample horizontal louver blind schedule in Evaluations for guidance in inserting requirements below. Remove brackets [ ] and <uppercase editor's notes> after editing schedule.
General: Provide horizontal louver blinds to comply with requirements in this Section and with the following schedule of blinds:

Horizontal Louver Blind Designation:

Color: Provide Architect's selections from manufacturer's full range of colors and patterns for horizontal louver blinds of type indicated.
Blind Location: See architectural floor plan for location
Location of Tilt Control: Right side, unless otherwise indicated.
Location of Cord Lock: Left side, unless otherwise indicated.
Mounting: End.
Place "End of Section 12511" at the end of last Product Data sheet or, if Product Data sheets are not used, at the end of Part 3.
END OF SECTION 12511

DIVISION 1
GENERAL REQUIREMENTS

SECTION 01100 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Owner's occupancy requirements.
3. Work restrictions.
4. Specification formats and conventions.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Department of Safety - Richfield ITS UHP Dispatch Modifications.

1. Project Location: Richfield, Utah 84701

B. Owner: State of Utah.

1. Owner's Representative: DFCM - Jeff Reddoor

C. Architect: WHW Engineering 8619 S. Sandy Parkway, Suite 101 Sandy, Utah 84070.

1.4 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.5 USE OF PREMISES

A. General: Each Contractor shall have use of premises for construction operations as indicated in project documents.

B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
2. Driveways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Use of Existing Building: Maintain existing building in a weathertight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.6 OWNER'S OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. The area of new construction is not occupied except for entrance, toilet rooms and break area. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations and do not proceed without written permission from Owner.

1.7 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday, except otherwise indicated, or agreed upon between owner and contractor.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.
3. If possible, schedule shut-downs for after hours and week ends.

1.8 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
2. Division 1: Sections in Division 1 govern the execution of the Work of all Sections in the Specifications.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

    a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01140 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

1. Limits: Confine constructions operations to area of disturbance as indicated on drawings.
2. Coordinate with the Owner for scheduling work and hours of noise sensitive operations and procedures.
3. Develop detailed Demolition and Construction Schedules outlining phased demolition and construction activities. Coordinate with the Owner for phasing of all Demolition and Construction activities, including the moving of employees and public functions to provide the least amount of disruption for continuing normal business activities.
4. Protect all adjacent areas from noise and construction dust and debris.
5. Maintain employee and public access of the site as required and at all times during normal business hours.
6. Protect employees and the public from potentially dangerous or harmful construction activities at all times.
7. After hours and weekend work may be required during the course of the project. Coordinate with the Owner's security personnel for access of the building and site during non-business hours. Provide security for construction personnel as required beyond the Owner's security forces and procedures.
8. Phase rooftop unit removal so new unit for the adjacent areas is installed and operating before removing the existing unit.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

END OF SECTION 01140

SECTION 01200 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Except as specifically defined otherwise, the following definitions shall supplement definitions of the Contract, General Conditions, Supplementary Conditions and other general contract documents, and apply generally to the work.

B. General Requirements: The provisions of Division-1 sections, General Requirements, apply to the entire work of the Contract.

C. Indicated: Shown on drawing by notes, graphics or schedules, or written into other portions of contract documents. Terms such as "shown", "noted", "scheduled", and "specified" have same meaning as "indicated", and are used to assist the reader in locating particular information.

D. Directed, Requested, Approved, Accepted, etc.: These terms imply "by the Engineer", unless otherwise indicated.

E. Approved by Engineer: In no case releases Contractor from responsibility to fulfill requirements of contract documents.

F. Project Site: Space available to Contractor at location of project, either exclusively or to be shared with separate contractors, for performance of work.

G. Furnish: Supply and deliver to project site, ready for unloading, unpacking, assembly, installation, and similar subsequent requirements.

H. Install: Operations at project site, including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar requirements.

1. Provide: Furnish and install, complete and ready for intended use.

I. Installer: Entity (firm or person) engaged to install work, by Contractor, subcontractor or sub-sub contractor. Installers are required to be skilled in work they are engaged to install.

J. Specification Text Format: Underscoring facilities scan reading, no other meaning. Imperative language is directed at Contractor, unless otherwise noted.

K. Overlapping/Conflicting Requirements: Most stringent (generally) requirement written directly into the contract documents is intended and will be enforced, unless specifically detailed language written into the contract documents clearly indicates that a less stringent requirement is acceptable. Refer uncertainties to the Engineer for a decision before proceeding.

1. Where optional requirements are specified in a parallel manner, option is intended to be Contractor's unless otherwise indicated.

L. Minimum Requirements: Indicated requirements are for a specific minimum acceptable level of quality/quantity, as recognized in the industry. Actual work must comply (within specified tolerances), or may exceed minimums within reasonable limits. Refer uncertainties to Engineer before proceeding.

M. Abbreviations, Plural Words: Abbreviations, where not defined in contract documents, will be interpreted to mean the normal construction industry terminology, determined by recognized grammatical rules, by the Engineer. Plural words will be interpreted as singular and singular words will be interpreted as plural where applicable for context of contract of documents.

N. Testing laboratory: An independent entity engaged for the project to provide inspections, tests, interpretations, reports and similar services.

1.2 STANDARDS AND REGULATIONS

A. Industry Standards: Applicable standards of construction industry have same force and effect on performance of the work as if copied directly into contract documents or bound and published therewith. Standards referenced in contract documents or in governing regulations have precedence over non-referenced standards, insofar as different standards may contain overlapping or conflicting requirements. Comply with standards in effect as of date of contract documents, unless otherwise indicated.

1. Abbreviations: Where abbreviations or acronyms are used in contract documents, they mean the well recognized name of entity in building construction industry; refer uncertainties to Engineer before proceeding, or consult "Encyclopedia of Associations" by Gale Research Co.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION 01200

SECTION 01300 - PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.1 ADMINISTRATION AND SUPERVISION

A. Coordination: Coordinate various elements of the work and entities engaged to perform work; and coordinate the work with existing facilities/conditions, and with work by separate contractors and by Owner.

1.2 INSTALLATION, GENERAL

A. Comply with manufacturer's instructions and recommendations to extent printed information is more detailed or stringent than requirements contained directly in contract documents.

B. Timing: Install work during time and under conditions which will ensure best possible results, coordinated with required inspection and testing. Timing is of the up most importance.

1.3 CLEANING AND PROTECTION

A. General: Clean each element of work at time of installation. Provide sufficient maintenance and protection during construction to ensure freedom from damage and deterioration at time of substantial completion.

PART 2 - PRODUCTS
(Not Used)

PART 3 - EXECUTION
(Not Used)

END OF SECTION 01300

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Related Sections include the following:

1. Divisions 01 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Engineer's responsive action.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 7 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 7 days for review of each resubmittal.

C. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Engineer.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 15515.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 15515.01A).

    i. Number and title of appropriate Specification Section.
    j. Drawing number and detail references, as appropriate.
    k. Location(s) where product is to be installed, as appropriate.
    l. Other necessary identification.

D. Deviations: Highlight or encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

E. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form.

F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are approved.

G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Mark each copy of each submittal to show which products and options are applicable.
2. Include the following information, as applicable:

    a. Manufacturer's written recommendations.
    b. Manufacturer's product specifications.
    c. Manufacturer's installation instructions.
    d. Standard color charts.
    e. Manufacturer's catalog cuts.
    f. Wiring diagrams showing factory-installed wiring.
    g. Printed performance curves.
    h. Operational range diagrams.
    i. Compliance with specified referenced standards.
    j. Testing by recognized testing agency.
    k. Application of testing agency labels and seals.
    l. Notation of coordination requirements.

3. Number of Copies: Submit five copies of Product Data, unless otherwise indicated. Engineer will return four copies. Mark up and retain one returned copy as a Project Record Document.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S / ACTION

A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.

C. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

D. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 01330

SECTION 01732 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Removal of one existing rooftop unit.
   2. Duct removal and modifications.
   3. Controls modifications.

B. Related Sections include the following:

   1. Division 1 Section "Summary" for use of premises and Owner-occupancy requirements.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PROJECT CONDITIONS

A. Owner will occupy building during demolition. Conduct selective demolition so Owner's operations will not be disrupted.

   1. Comply with requirements specified in Division 1 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

C. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 1 Section "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection at the rooftop locations, if needed, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
2. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
3. Maintain adequate ventilation when using cutting torches.
4. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
5. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

C. Coordinate with Owner if any removed items need to be given to Owner.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 01732

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Related Sections include the following:

1. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
2. Divisions 1 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Complete startup testing of systems.
8. Submit test/adjust/balance records.
9. Terminate and remove temporary facilities from Project site, along with construction tools and similar elements.
10. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
11. Complete final cleaning requirements, including touchup painting.
12. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to General Conditions.
2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 WARRANTIES

A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual. Bind in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project: This is for areas only disturbed by this contractor.

    a. Clean Project site, yard, and grounds, in areas used by construction activities, including areas of rubbish, waste material, litter, and other foreign substances.
    b. Remove petrochemical spills, stains, and other foreign deposits.
    c. Remove tools, construction equipment, machinery, and surplus material from Project site.
    d. Clean exposed exterior and interior hard-surfaced finishes damaged or marked during construction.
    e. Vacuum carpet and similar soft surfaces in areas used by contractors. Shampoo if visible soil or stains remain.
    f. Remove labels that are not permanent from equipment, piping, etc.
    g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.

1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

h. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint, etc. and other foreign substances.

i. Leave Project clean.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.

B. Related Sections include the following:

1. Division 1 Section "Closeout Procedures" for general closeout procedures.
2. Divisions 1 through 16 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an understandable drawing technique.

c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Revisions to routing of piping.
d. Actual equipment locations.
e. Changes made by Change Order or Change Directive.
f. Changes made following Engineer's written orders.
g. Details not on the original Contract Drawings.
h. Field records for variable and concealed conditions.
i. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings completely and accurately.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

END OF SECTION 01781

DIVISION 15
MECHANICAL

SECTION 15010 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. General Conditions and Division 01 apply to this Division.

1.2 SCOPE

A. Includes -

1. Furnish all labor, materials, and equipment necessary for the completion of the mechanical scope of work.
2. Furnish and install all motors specified in this Division and be responsible for the proper operation of electrical powered equipment furnished by this Division.
3. Furnish exact location of electrical connections and information on motor controls to Division 16.
4. Mechanical Contractor shall obtain the services of independent Test and Balance Agency.
5. Placing the air conditioning, heating, ventilating, and exhaust systems into full operation and continuing their operation during each working day of testing and balancing.
6. Making changes in pulleys, belts, and dampers, or adding dampers, as required for the correct balance as recommended by Balancing Contractor at no additional cost to Owner.
7. Air balance, final adjustment and test run.
8. The satisfactory performance of the completed systems is a requirement of this specification.

B. Related Work Specified Elsewhere -

1. Conduit, line voltage wiring, outlets, and disconnect switches specified in Division 16.
2. Magnetic starters and thermal protective devices (heaters) not a factory mounted integral part of packaged equipment are specified in Division 16.

1.3 SITE INSPECTION

A. The Contractor shall examine the site and understand the conditions which may affect the performance of work of this Division before submitting proposals for this work.

B. No subsequent allowance for time or money will be considered for any consequence related to failure to examine existing site conditions.

1.4 DRAWINGS

A. Mechanical drawings show general arrangement of ductwork, equipment, etc; however, locations are to be regarded as shown diagrammatically only. Follow as closely as actual building construction and work of other trades will permit.

B. Because of the small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate existing structural and finished conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.

C. If changes in location of equipment, ducts, etc. are required due to lack of coordination of work under this division, such changes shall be made without charge. Contractor shall review drawings and any changes required by them shall be brought to the attention of the Engineer prior to bidding or commencement of work.

1.5 CODE REQUIREMENTS, FEES, AND PERMITS

A. The work shall be installed in accordance with the following applicable codes, ordinances and standards unless otherwise specified. The codes and standards shall include but not be limited to and be of the latest and current editions.

1. Air Movement and Control Association (AMCA)
2. American National Standards Institute (ANSI)
3. Air Conditioning & Refrigeration Institute (ARI)
4. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) - ASHRAE 90.1-2004
5. American Society of Mechanical Engineers (ASME)
6. American Society of Testing Materials (ASTM)
7. American Standards Association (ASA)
8. Associated Air Balance Council (AABC)
9. National Electrical Code (NEC)
10. National Fire Protection Association (NFPA)
11. Sheet Metal and Air Conditioning contractors National Association (SMACNA)
12. Underwriters Laboratories (UL)
13. International Building Code (IBC) 2006 Ed
14. International Mechanical Code (IMC) 2006 Ed
15. International Plumbing Code (IPC) with Utah Amendments 2006 Ed
16. International Energy Conservation Code (IECC) 2006 Ed
17. Utah State Safety Orders (OSHA/UOSH)
18. Utah Fire Rating Bureau
19. Utah Air Conservation Regulations/Waste Disposal regulations.
20. ASHRAE Ventilation STD.62-2004

B. Should drawings conflict with any code, the code shall govern. If drawings and specifications establish a quality exceeding the code, the drawings and

specifications shall govern. If conflicts do exist among the drawings, specifications and codes, the same shall be brought to the attention of the Engineerin writing prior to bidding, otherwise Contractor shall comply with applicable codes.

C. The latest edition of all codes shall be used.

1.6 OPERATION AND MAINTENANCE MANUAL FOR MECHANICAL SYSTEMS

A. Upon completion of work and before final payment, Contractor shall furnish and deliver to the Owner, through the Engineer, installation, operation and maintenance manuals with instructions for all new materials and equipment used in the building. The contractor shall provide three (3) hard copies of the manuals, and three (3) CD's with electronic copies of the manuals. Electronic information shall be .PDF format. The CD's shall include the same information as the hard copies, and shall be organized in the same manner with electronic bookmarks for each section. CD case and the CD itself shall be labeled the same as the hard copies of the manuals.

B. Bind Operation and Maintenance Manual for Mechanical Systems in a hard-backed piano hinge loose-leaf binder with strong sturdy cover. The project name shall be on the spine and the front of the binder. The front of the binder shall include the following information:

OPERATION
AND
MAINTENANCE
MANUAL
for MECHANICAL SYSTEMS of
(Name of Project)
(Location of Project)
(Date of Project Award)
(Name of Architect)

C. Introduction

1. Title page including name of project, project number, date awarded and date of substantial completion.
2. Second page shall contain the names, phone numbers and addresses of Architect, Consulting Engineers, Mechanical Contractor, and General Contractor.
3. Third page shall include a Table of Contents for the entire manual.

D. First Section - Summary information including:

1. First page shall contain the contractor's warranties.
2. Second page shall contain a list of names, addresses and phone numbers of contractors and all sub-contractors and work to which each was assigned.

3. Final page or pages shall contain an equipment list. The list shall contain each item of equipment or material for which a submittal was required giving ID or tag no as contained on the drawings make and model No. Serial No. Identification No. Location in building, function along with the name, address, and phone number of the supplier.

E. Second Section - Mechanical Equipment O&M data including:

1. Mechanical maintenance schedule, including a lubrication list when necessary.
2. Mechanical Equipment Operation and Maintenance Data including:

    a. Equipment descriptions
    b. Detailed installation instruction, operating and maintenance instructions. Instructions include in a step by step manner identifying start-up, operating, shutdown and emergency action sequence sufficiently clear so a person unfamiliar with the equipment could perform its operations.
    c. Equipment drawings, performance curves, operating characteristics, etc.
    d. Name addresses and phone number of manufacturer, fabricator and local vender clearly printed or stamped on cover.
    e. Complete parts listing which include catalog number, serial number, contract number or other accurate provision for ordering replacement and spare parts.
    f. Certified drawings, where applicable, showing assembly of parts and general dimensions.

3. Approved Mechanical submittals

F. Third Section - Controls O&M data including:

1. Sequence of Operation
2. Description of each operating system included location of switches, breakers, thermostats, and control devices. Describe all alarms and cautions for operation.

G. The Fourth Section shall contain a complete air test and balance report. The report shall contain the name, address and phone number of the agency. It shall also include:

1. Floor plans showing all air openings and thermostat locations clearly marked and cross referenced with data sheets. Format may be 8 1/2 x 11 or 11x14 if legible.
2. Data sheets showing amount of air at each setting. See sections 15950.
3. List of equipment with date of last calibration.

H. Drawings and reproducible masters of drawings as required in individual specification sections, are not to be bound in volumes but are to be delivered separate with the maintenance manuals.

I. See the following checklist for assistance in assembling manual:

Item #	Description	Y, N, or NA
1.	3 ring heavy duty binder with Project name, number and date on cover and project name on spine.	
2.	O&M manual on CD (with label on CD matching label on manual). Electronic copy shall be a PDF file with bookmarks that match the tabs in the hard copy.	
3.	Title Page [including project name, number, address, date awarded, date of substantial completion]	
4.	Second Page Contact List including architect, mechanical engineer, mechanical contractor, and general contractor	
5.	Table of Contents	
6.	**Section 1 - Summary**	
A.	Warranty	
B.	Mechanical's Sub-contractor List	
C.	Vendor List	
D.	Equipment List	
7.	**Section 2 – Mechanical Equipment**	
A.	Maintenance Schedule (including lubrication list)	
B.	Mechanical Equipment O&M Data (for each piece of equipment submitted) per specifications	
C.	Approved mechanical submittals	
8.	**Section 3 - Controls**	
A.	Sequence of Operation	
B.	Controls diagrams	
C.	Controls Equipment	
9.	**Section 4 – Test and Balance Report**	
A.	Complete Test and Balance Report per specifications	

1.7 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Contractor shall instruct building maintenance personnel in the operation and maintenance of the installed mechanical systems utilizing the Operation and Maintenance Manual when so doing.

B. Minimum instruction periods shall be as follows -

1. Mechanical and Temperature control- Eight hours.

C. Instruction periods shall occur before final inspection when systems are properly working and before final payment is made.

D. An additional four hours of instruction will be provided by each contractor, after 60 days of system operation by owner to insure proper system operation and answer questions.

1.8 RECORD DRAWINGS

A. Contractor shall keep an up-to-date set of mechanical drawings in his custody showing all changes in red, clearly defined and neatly drafted by him. At the end of construction, he shall turn these drawings over to the Engineer. Record drawings must be completed and submitted prior to final inspection.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION 15010

SECTION 15050 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Mechanical demolition.
2. Equipment installation requirements common to equipment sections.
3. Painting and finishing.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in manufactures shipping enclosures. Maintain through shipping, storage, and handling to prevent damage and to prevent entrance of dirt, debris, and moisture.

1.4 COORDINATION

A. Coordinate requirements for access panels for mechanical items requiring access.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.

1. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
2. Equipment to Be Removed: Disconnect and cap services and remove equipment.

3.2 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible access around units.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

3.3 PAINTING

A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

END OF SECTION 15050

SECTION 15077 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Duct labels.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.
8. Adhesive: Not allowed.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), also shown CFM and S.P.

2.2 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White Insert color.

C. Background Color: Black.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Adhesive: Not allowed.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean duct and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 DUCT LABEL INSTALLATION

A. Install plastic-laminated duct labels on air ducts:

B. Stenciled Duct Label Option: Stenciled labels, showing service and flow direction, may be provided instead of plastic-laminated duct labels, at Installer's option, if lettering larger than 1 inch high is needed for proper identification because of distance from normal location of required identification.

C. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

END OF SECTION 15077

SECTION 15733 - PACKAGED ROOFTOP UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes cooling and heating packaged rooftop units.

1.3 DEFINITIONS

A. DDC: Direct-digital controls.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, methods of field assembly, components, and location and size of each field connection.

1. Design Calculations: For selecting and designing restrained vibration isolation roof-curb.
2. Mounting Details: For securing and flashing roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
3. Wiring Diagrams: Power, signal, and control wiring.

C. Startup Service reports.

D. Operation and Maintenance Data: For rooftop units to include in operation, and maintenance manuals.

E. Warranty: Warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of rooftop units and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Units shall be designed to operate with HCFC-free refrigerants.

1.6 COORDINATION

A. Coordinate size, installation, and structural capacity of roof curbs, equipment supports, and roof penetrations.

B. Coordinate size, location, and installation of rooftop unit manufacturer's roof curbs and equipment supports with existing roof.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components listed below that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrie 50HJ006 and 007 or equal by.
2. Trane.
3. Prior approved equal.

2.2 CABINET

A. Construction: Single wall.

B. Exterior Casing: Galvanized steel with baked-enamel paint finish with lifting lugs and knockouts for electrical and piping connections.

C. Interior Casing: Galvanized steel.

D. Base Rails: Galvanized-steel rails for mounting on roof curb.

E. Service Doors: Hinged access doors with neoprene gaskets.

F. Internal Insulation: Fibrous-glass duct lining complying with ASTM C 1071, Type II.

1. Thickness: 1 inch.
2. Insulation Adhesive: Comply with ASTM C 916, Type I.
3. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to casing without damaging liner and without causing air leakage when applied as recommended by manufacturer.

G. Condensate Drain Pans: Formed sections of galvanized-steel sheet designed for self-drainage. Fabricate pans with slopes to preclude buildup of microbial slime.

2.3 SUPPLY-AIR FAN

A. Fan: Forward-curved centrifugal; statically and dynamically balanced, galvanized steel, mounted on solid-steel shaft with self-aligning, permanently lubricated ball bearings.

B. Motor: Totally enclosed, single-speed motor.

C. Drive: V-belt drive with matching fan pulley and adjustable motor sheaves and belt assembly with minimum 1.4 service factor.

D. Mounting: Fan wheel, motor, and drives shall be mounted in fan casing with spring isolators.

2.4 REFRIGERATION SYSTEM

A. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Code for Mechanical Refrigeration."

B. Compressors: Reciprocating compressors with integral vibration isolators, internal overcurrent and overtemperature protection, internal pressure relief, and crankcase heater.

C. EER and COP: 11R as defined by ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Refrigerant: R-22.

E. Refrigeration System Specialties:

1. Expansion valve with replaceable thermostatic element.
2. Refrigerant dryer.
3. High-pressure switch.
4. Low-pressure switch.
5. Thermostat for coil freeze-up protection during low ambient temperature operation or loss of air.
6. Brass service valves installed in discharge and liquid lines.
7. Operating charge of refrigerant.

F. Capacity Control: Single compressor with evaporator and condenser coil within the refrigerant section to provide initial precooling and reheat for humidity control.

G. Refrigerant Coils: Evaporator and condenser coils shall be designed, tested, fabricated, and rated according to ARI 410 and ASHRAE 33. Coils shall be leak tested under water with air at 315 psig.

1. Capacity Reduction: Circuit coils for face control.
2. Tubes: Copper.
3. Fins: Aluminum with minimum fin spacing of 0.071 inch.
4. Fin and Tube Joint: Mechanical bond.
5. Suction and Distributor: Seamless copper tube with brazed joints.
6. Source Quality Control: Test to 450 psig, and to 300 psig underwater.

H. Condenser Fan: Propeller type, directly driven by motor.

I. Safety Controls:

1. Compressor motor and outside-coil fan motor low ambient lockout.
2. Overcurrent protection for compressor motor and outside-coil fan motors.

2.5 ELECTRIC-RESISTANCE HEATING

A. Electric-Resistance Heating Elements: Coiled resistance wire of 80 percent nickel and 20 percent chromium; surrounded by compacted magnesium oxide powder in tubular-steel sheath; with spiral-wound, copper-plated, steel fins continuously brazed to sheath.

B. Electric-Resistance Heating Elements: Open-coil resistance wire of 80 percent nickel and 20 percent chromium; supported and insulated by floating ceramic bushings recessed into casing openings, fastened to supporting brackets, and mounted in galvanized-steel frame.

1. Heating Capacity: Low density 35 W per sq. in., factory wired for single-point wiring connection; with time delay for element staging, and overcurrent and overheat protective devices.
2. Safety Controls:

a. Blower-motor interlock, air-pressure switch.
b. Quiet mercury contactors.
c. Time delay between steps.
d. Integral, nonfused power disconnect switch.

2.6 OUTDOOR-AIR INTAKE AND DAMPERS

A. Dampers: Leakage rate, according to AMCA 500, shall not exceed 2 percent of air quantity at face velocity of 2000 fpm through damper and pressure differential of 4-inch wg.

B. Damper Operators: Electric.

C. Mixing Boxes: Parallel-blade, galvanized-steel dampers mechanically fastened to steel operating rod inside cabinet. Connect operating rods with common interconnecting linkages so dampers operate simultaneously.

D. Outdoor-Air Intake Hoods: Galvanized steel, with bird screen and finish to match cabinet.

2.7 ECONOMIZER:

A. Provide fully modulating damper motors and controls to position outside and return air dampers so that outside air will be used to satisfy the building cooling load in the economizer cycle and minimum outside air during occupied mode.

B. Low leakage dampers shall ride on nylon bearings.

C. Integrated economizer control shall allow compressors to cycle for additional cooling as needed based on outdoor enthalpy.

D. Damper actuators shall be opposing gear driven, 24 volt, fully modulating design. Plug-in control board shall consist of adjustable minimum positioner, enthalpy setpoint, and DIP switches for setting type of control logic use.

E. Outdoor air hood with filters shall be galvanized steel with a powder coat enamel paint finish electrostatically bonded to the metal.

F. Provide extruded aluminum gravity relief dampers to prevent blow-back and outdoor air infiltration during off cycle.

G. Provide rainhoods and birdscreens.

2.8 FILTERS

A. Comply with NFPA 90A.

B. Disposable Panel Filters: 2-inch- thick, factory-fabricated, flat-panel-type, disposable air filters with holding frames, with a minimum efficiency report value of 6 according to ASHRAE 52.2 and 90 percent average arrestance according to ASHRAE 52.1.

1. Media: Interlaced glass fibers sprayed with nonflammable adhesive.
2. Frame: Galvanized steel.

2.9 CONTROLS

A. Control equipment and sequence of operation are specified in Division 15 Section "HVAC Instrumentation and Controls."

B. Factory-wire connection for controls' power supply.

C. Control devices, including sensors, transmitters, relays, switches, thermostats, detectors, operators, actuators, and valves, shall be manufacturer's standard items to accomplish indicated control functions.

D. Unit Controls: Solid-state control board and components with field-adjustable control parameters.

E. Supply-Fan Control: Time clock shall switch operation from occupied to unoccupied. Night setback thermostat shall cycle fan during unoccupied periods to maintain space temperature.

1. Timer: Seven-day electronic clock.

F. Refrigeration System Controls:

1. Unit-mounted enthalpy controller shall lock out refrigerant system when outdoor-air temperature is less than 60 deg F.

G. Integral Smoke Alarm: Smoke detector installed in return air.

H. DDC Temperature Control: Stand-alone control module for link between unit controls and existing DDC temperature-control system. Control module shall be compatible with temperature-control system specified in Division 15 Section "HVAC Instrumentation and Controls." Links shall include the following:

1. Start/stop interface relay, and relay to notify DDC temperature-control system alarm condition.
2. Hardware interface or additional sensors for the following:

a. Room temperature.
b. Discharge air temperature.
c. Refrigeration system operating.
d. Furnace operating.
e. Constant and variable motor loads.
f. Monitor cooling load.
g. Monitor economizer cycles.
h. Monitor air distribution static pressure and ventilation air volumes.

2.10 STANDARD ROOF CURB

A. Provide unit manufacturer’s factory built curb that shall meet the National Roofing Contractors Association August 1985 guidelines for roof mounted installations.

B. The curb shall be 14 inches high, 16 gauge, galvanized steel construction with a 2 x 4 pressure treated wood nailer strip furnished on the outside.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting installation of rooftop units.

B. Examine roughing-in for ducts, and electrical systems to verify actual locations of connections before equipment installation.

C. Examine roof curbs and equipment supports for suitable conditions.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install roof curb on roof structure, according to [NRCA's "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts."] [ARI Guideline B.] Install and secure rooftop units on curbs and coordinate roof penetrations and flashing with roof construction.

3.3 CONNECTIONS

A. Duct Connections: Duct installation requirements are specified in Division 15 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to rooftop units with flexible duct connectors. Flexible duct connectors are specified in Division 15 Section "Duct Accessories."

B. Electrical Connections: Comply with requirements in Division 16 Sections for power wiring, switches, and motor controls.

C. Ground equipment according to Division 16 Section "Grounding and Bonding."

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Complete installation and startup checks according to manufacturer's written instructions and perform the following:

1. Inspect for visible damage to electrical heating coil.
2. Inspect for visible damage to compressor, air-cooled outside coil, and fans.
3. Inspect casing insulation for integrity, moisture content, and adhesion.
4. Verify that clearances have been provided for servicing.
5. Verify that controls are connected and operable.
6. Verify that filters are installed.

7. Clean outside coil and inspect for construction debris.
8. Verify bearing lubrication.
9. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
10. Adjust fan belts to proper alignment and tension.
11. Start unit.
12. Start refrigeration system when outdoor-air temperature is within normal operating limits.
13. Inspect and record performance of interlocks and protective devices including response to smoke detectors by fan controls and fire alarm.
14. Operate unit for run-in period.
15. Calibrate thermostats and controls.
16. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
17. Start refrigeration system and measure and record the following:

    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.

18. Verify operational sequence of controls.
19. Measure and record the following airflows. Plot fan volumes on fan curve.

    a. Supply-air volume.
    b. Return-air volume.
    c. Outdoor-air intake volume.

20. Simulate maximum cooling demand and inspect the following:

    a. Compressor refrigerant suction and hot-gas pressures.
    b. Short circuiting of air through outside coil or from outside coil to outdoor-air intake.

C. After startup and performance testing, change filters, verify bearing lubrication, and adjust belt tension.

D. Remove and replace components that do not pass tests and inspections and retest as specified above.

E. Prepare written report of the results of startup services.

3.5 ADJUSTING

A. Adjust initial temperature set points.

B. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied

conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain rooftop units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 15733

SECTION 15815 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.
7. Seismic-restraint devices.

B. Related Sections:

1. Division 15 Section "Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.
2. Division 15 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing requirements for metal ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated.

1. Static-Pressure Classes:

a. Supply Ducts: 2-inch wg.
b. Supply Ducts (Downstream from Air Terminal Units): 1-inch wg.
c. Return Ducts (Negative Pressure): 1-inch wg.

2. Leakage Class:

a. Round Supply-Air Duct: 3 cfm/100 sq. ft. at 1-inch wg.
b. Rectangular Supply-Air Duct: 6 cfm/100 sq. ft. at 1-inch wg.
c. Flexible Supply-Air Duct: 6 cfm/100 sq. ft. at 1-inch wg.

B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
2. Seismic Hazard Level B: Seismic force to weight ratio, 0.30.
3. Seismic Hazard Level C: Seismic force to weight ratio, 0.15.

1.4 SUBMITTALS

A. Product Data: For each type of the following products:

1. Liners and adhesives.
2. Sealants and gaskets.
3. Seismic-restraint devices.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Sheet Metal Connectors, Inc.
e. Spiral Manufacturing Co., Inc.
f. Metco.
g. Prior approved equal.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.

1. Galvanized Coating Designation: G60.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. CertainTeed Corporation; Insulation Group.
    b. Johns Manville.
    c. Knauf Insulation.
    d. Owens Corning.
    e. Prior approved equal.
    f. Maximum Thermal Conductivity:

        1) Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
        2) Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.

2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Solvent-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.

B. Insulation Pins and Washers:

1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."

1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.

5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:

    a. Fan discharges.
    b. Intervals of lined duct preceding unlined duct.
    c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.

9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

    a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

D. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

F. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2.7 SEISMIC-RESTRAINT DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.; a division of Cooper Industries.
2. Ductmate Industries, Inc.
3. Hilti Corp.
4. Kinetics Noise Control.
5. Loos & Co.; Cableware Division.

6. Mason Industries.
7. TOLCO; a brand of NIBCO INC.
8. Unistrut Corporation; Tyco International, Ltd.
9. Prior approved equal.

B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.

1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.

C. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.

D. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections to hanger rod.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through fire-rated interior partitions, install fire dampers. Comply with requirements in Division 15 Section "Duct Accessories" for fire and smoke dampers.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

3.2 SEAM AND JOINT SEALING

A. Seal duct seams and joints for duct static-pressure and leakage classes specified in "Performance Requirements" Article, according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 1-2, "Standard Duct Sealing Requirements," unless otherwise indicated.

1. For static-pressure classes 1- and 1/2-inch wg, comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Seal Class C:

3.3 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Structural-steel fasteners appropriate for construction materials to which hangers are being attached.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets

E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 SEISMIC-RESTRAINT-DEVICE INSTALLATION

A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."

1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
2. Brace a change of direction longer than 12 feet.

B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.

E. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, or upper truss chords of bar joists.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Division 15 Section "Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual."
2. Test the following systems:

    a. Supply air.

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before insulation application.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."

    a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.7 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.

1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 15 Section "Duct Accessories" for access panels and doors.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets i.e. grilles and diffusers.
2. Supply, fan including fan housings, plenums, scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Roof top air-handling units internal surfaces and components including coil section, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Supply-air ducts, dampers, actuators, and turning vanes.

D. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

6. Provide drainage and cleanup for wash-down procedures.

3.8 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel:

B. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.

C. Liner:

1. Supply- and Return-Air Ducts: Fibrous glass, Type I.

D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."

a. Velocity 1000 fpm or Lower:

1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.

b. Velocity 1000 to 1500 fpm:

1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

c. Velocity 1500 fpm or Higher:

1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."

a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible,"

Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.

b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

E. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."

a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Spin in.

2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.

a. Velocity 1000 fpm or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm: Conical tap.
c. Velocity 1500 fpm or Higher: 45-degree lateral.

F. Duct Schedule

1. Rectangular duct with liner:

a. Low pressure supply and return.

2. Single wall round with wrapped insulation.

a. Low pressure supply and return.

END OF SECTION 15815

SECTION 15820 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Volume dampers.
2. High Efficiency Take-Offs.
3. Combination fire and smoke dampers.
4. Turning vanes.
5. Duct-mounting access doors.
6. Flexible connectors.
7. Flexible ducts.
8. Duct accessory hardware.

1.3 SUBMITTALS

A. Product Data: For the following:

1. Volume dampers.
2. High Efficiency Take-Offs.
3. Combination fire and smoke dampers.
4. Turning vanes.
5. Duct-mounting access doors.
6. Flexible connectors.
7. Flexible ducts.

1.4 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 VOLUME DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. American Warming and Ventilating.
3. Flexmaster U.S.A., Inc.
4. McGill AirFlow Corporation.
5. METALAIRE, Inc.
6. Nailor Industries Inc.
7. Penn Ventilation Company, Inc.
8. Ruskin Company.
9. Vent Products Company, Inc.
10. Air Rite.
11. Prior approved equal.

B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers

in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.

C. Standard Volume Dampers: Opposed-blade design, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.

1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized sheet steel.
3. Blade Axles: Galvanized steel.
4. Bearings: Oil-impregnated bronze.
5. Tie Bars and Brackets: Galvanized steel.

D. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.4 HIGH EFFICIENCY TAKE-OFF

A. Factory-manufactured rectangular-to-round or round-to-round 45 degree leading tap fabricated of 24 ga zinc-coated lockforming quality steel sheets meeting requirements of ASTM A 653, with G-90 coating.

B. One inch wide mounting flange with die formed corner clips, pre-punched mounting holes, and adhesive coated gasket.

C. Manual Volume Damper:

1. Single blade, 22 ga minimum.
2. 3/8 inch minimum square rod with brass damper bearings at each end.
3. Heavy duty locking quadrant on 1-1/2 inch high stand-off mounting bracket attached to side of round duct.

D. Approved Manufacturers:

1. HETD-L by Daniel Manufacturing.
2. STO by Flexmaster USA Inc.
3. HET by Sheet Metal Connectors Inc.
4. Hercules.
5. Air-Rite.
6. Prior approved equal.

2.5 SMOKE AND COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:

1. Air Balance, Inc.

2. CESCO Products.
3. Greenheck.
4. Nailor Industries Inc.
5. Penn Ventilation Company, Inc.
6. Ruskin Company.
7. Prior approved equal.

B. General Description: Labeled according to UL 555S. Combination fire and smoke dampers shall be labeled according to UL 555 for 1-1/2-hour rating.

C. Fusible Links: Replaceable, 165 deg F rated.

D. Frame and Blades: 0.064-inch- thick, galvanized sheet steel.

E. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized sheet steel; length to suit wall or floor application.

F. Damper Motors: Modulating and two-position action.

1. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
2. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
3. Electrical Connection: 115 V, single phase, 60 Hz.

2.6 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.

B. Manufactured Turning Vanes: Fabricate 1-1/2-inch- wide, single-vane, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.

1. Available Manufacturers:

a. Ductmate Industries, Inc.
b. Duro Dyne Corp.
c. METALAIRE, Inc.
d. Ward Industries, Inc.
e. Prior approved equal.

2.7 DUCT-MOUNTING ACCESS DOORS

A. General Description: Fabricate doors airtight and suitable for duct pressure class.

B. Door: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.

1. Manufacturers:

a. American Warming and Ventilating.
b. CESCO Products.
c. Ductmate Industries, Inc.
d. Flexmaster U.S.A., Inc.
e. Greenheck.
f. McGill AirFlow Corporation.
g. Nailor Industries Inc.
h. Ventfabrics, Inc.
i. Ward Industries, Inc.
j. Air Rite.
k. Prior approved equal.

2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
3. Provide number of hinges and locks as follows:

a. Less Than 12 Inches Square: Secure with two sash locks.
b. Up to 18 Inches Square: Two hinges and two sash locks.
c. Up to 24 by 48 Inches: Three hinges and two compression latches.
d. Sizes 24 by 48 Inches and Larger: One additional hinge.

C. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

D. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

2.8 FLEXIBLE CONNECTORS

A. Manufacturers:

1. Ductmate Industries, Inc.
2. Duro Dyne Corp.
3. Ventfabrics, Inc.
4. Ward Industries, Inc.
5. Prior approved equal.

B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Select metal compatible with ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 26 oz./sq. yd..

2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd..
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

2.9 FLEXIBLE DUCTS

A. Manufacturers:

1. Flexmaster U.S.A., Inc.
2. Hart & Cooley, Inc.
3. McGill AirFlow Corporation.
4. Themaflex.
5. Prior approved equal.

B. Insulated-Duct Connectors: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene or aluminized vapor barrier film.

1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 210 deg F.

C. Flexible Duct Clamps: [Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action] [Nylon strap], in sizes 3 through 18 inches to suit duct size.

2.10 DUCT ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.

B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts.

C. Install volume dampers in ducts with liner; avoid damage to and erosion of duct liner.

D. Provide balancing dampers at points on supply systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.

E. Provide test holes at fan inlets and outlets and elsewhere as indicated.

F. Install fire and smoke dampers, with fusible links, according to manufacturer's UL-approved written instructions.

G. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:

1. Adjacent to fire or smoke dampers, providing access to reset or reinstall fusible links.

H. Install the following sizes for duct-mounting, rectangular access doors:

1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.

I. Install the following sizes for duct-mounting, round access doors:

1. One-Hand or Inspection Access: 8 inches in diameter.
2. Two-Hand Access: 10 inches in diameter.

J. Label access doors according to Division 15 Section "Mechanical Identification."

K. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.

L. Connect terminal units to supply ducts with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

M. Connect diffusers to low pressure ducts with maximum 36-inch lengths of flexible duct clamped or strapped in place.

N. Connect flexible ducts to metal ducts as detailed on the drawings.

O. Install duct test holes as required for testing and balancing purposes.

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual-volume dampers is specified in Division 15 Section "Testing, Adjusting, and Balancing."

END OF SECTION 15820

SECTION 15855 - DIFFUSERS AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes ceiling mounted diffusers, and grilles.

B. Related Sections include the following:

1. Division 15 Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers and grilles.

1.3 SUBMITTALS

A. Product Data: For each product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser and Grille Schedule: Indicate Drawing designation, room location, quantity, model number, size, and accessories furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 GRILLES

A. Fixed Face Ceiling Return Air Grille:

1. Products:

a. Price Industries; 535.

b. Titus; 355RL.
c. Krueger; S85H.
d. Carnes; RSL4.
e. Tuttle & Bailey; T70D.
f. Or equal by:

2. Material: Steel.
3. Finish: Baked enamel, white.
4. Face Arrangement: 1/2 inch horizontal blade spacing.
5. Frame: 1-1/4 inches wide.

2.3 CEILING DIFFUSER OUTLETS

A. Rectangular and Square Ceiling Diffusers:

1. Products:

a. Price Industries; SMD.
b. Titus; TDC.
c. Krueger; SH.
d. METALAIRE, Inc., Metal Industries Inc.; 55005.
e. Tuttle & Bailey; MS.
f. Carnes; SKSA.

2. Material: Steel.
3. Finish: Baked enamel, white.

2.4 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, provide lay-in ceiling module.

C. Install diffusers and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers and grilles to air patterns as directed, before starting air balancing.

END OF SECTION 15855

SECTION 15900 - HVAC INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes control equipment for the new rooftop units HVAC systems and components.

B. This controls contractor shall provide new thermostat, relocation of thermostats, demolition of thermostats, wiring, points etc. For the rooftop, bypass controls and VVT controls.

C. Controls contractor shall connect to existing buildings VVT system.

1.3 COORDINATION

A. Coordinate location of new thermostat, and the relocation of existing thermostats as required.

B. Coordinate equipment with Division 16 Section "Security Access" to achieve compatibility with equipment that interfaces with that system.

C. Coordinate equipment with Division 16 Section "Fire Alarm" to achieve compatibility with equipment that interfaces with that system.

D. Coordinate equipment with Division 16 Section "Electrical Power Monitoring and Control" to achieve compatibility of communication interfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 CONTROL SYSTEM

A. Manufacturers:

1. Carrier.
2. Prior approved equal.

B. Control system shall consist of sensors, thermostats, existing and new, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.

C. Control system shall include the following:

1. Building security system.
2. Fire alarm system.

2.3 THERMOSTATS

A. Manufacturers:

1. Carrier.
2. Prior approved equal.

B. Electric, solid-state, microcomputer-based room thermostat.

1. Automatic switching from heating to cooling.
2. Preferential rate control to minimize overshoot and deviation from set point.
3. Instant override of set point for continuous or timed period from 1 hour to 31 days.
4. Short-cycle protection.
5. Programming based on every day of week.
6. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, and fan on-auto.
7. Battery replacement without program loss.
8. Thermostat display features include the following:

    a. Time of day.
    b. Actual room temperature.
    c. Programmed temperature.
    d. Programmed time.
    e. Duration of timed override.
    f. Day of week.
    g. System mode indications include "heating," "off," "fan auto," and "fan on."

2.4 CONTROL CABLE

A. Electronic and fiber-optic cables for control wiring are specified in Division 16 Section "Voice and Data Communication Cabling."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that power supply is available to control units.

B. This contractor shall field verify existing VVT controls and method of installation for the rooftop unit not supplying the new dispatch area before connecting into the new system.

3.2 INSTALLATION

A. Connect and configure equipment and software to achieve sequence of operation specified.

B. Verify location of new and existing thermostats and other exposed control sensors with Drawings and room details before installation. Install devices 48 inches above the floor.

C. Install labels and nameplates to identify control components according to Division 15 Section "Mechanical Identification."

3.3 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Division 16 Section "Raceways and Boxes."

B. Install building wire and cable according to Division 16 Section "Conductors and Cables."

C. Install signal and communication cable according to Division 16 Section "Voice and Data Communication Cabling."

1. Conceal cable
2. Install concealed cable in raceway.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing.

B. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.

2. Test and adjust controls and safeties.

END OF SECTION 15900

SECTION 15950 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes TAB to produce design objectives for the following:

1. Air Systems:

    a. Constant-volume air systems.

2. Verifying that automatic control devices are functioning properly.
3. Reporting results of activities and procedures specified in this Section.

1.3 DEFINITIONS

A. Adjust: To regulate air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.

C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.

D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

E. NC: Noise criteria.

F. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

G. RC: Room criteria.

H. Report Forms: Test data sheets for recording test data in logical order.

I. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

J. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

K. TAB: Testing, adjusting, and balancing.

L. Terminal: A point where the controlled medium, enters or leaves the distribution system.

M. Test: A procedure to determine quantitative performance of systems or equipment.

N. Testing, Adjusting, and Balancing (TAB) Firm: The entity responsible for performing and reporting TAB procedures.

1.4 SUBMITTALS

A. Qualification Data: Within 7 days from Contractor's Notice to Proceed, submit 4 copies of evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Sample Report Forms: Submit two sets of sample TAB report forms.

C. Warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. TAB Firm Qualifications: Engage a TAB firm certified by AABC or NEBB.

1. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.

B. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

C. Instrumentation Type, Quantity, and Accuracy: As described in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

D. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.

1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

E. Approved TAB agencies:

1. Danis Test and Balance.
2. Bonneville Test and Balance.
3. BTC Services.
4. Certified Test and Balance.
5. Intermountain Test and Balance.
6. RS Analysis.
7. Technical Specialties.
8. Testing and Balancing, Inc.

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.

B. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.

C. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 WARRANTY

A. National Project Performance Guarantee: Provide a guarantee on AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" forms stating that AABC will assist in completing requirements of the Contract Documents if TAB firm fails to comply with the Contract Documents. Guarantee includes the following provisions:

1. The certified TAB firm has tested and balanced systems according to the Contract Documents.
2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.

1. Contract Documents are defined in the General and Supplementary Conditions of Contract.
2. Verify that balancing devices, such as test ports and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Project Record Documents described in Division 1 Section "Project Record Documents."

D. Examine design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

F. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.

G. Examine system and equipment test reports.

H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

I. Examine HVAC equipment to ensure that clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine VVT bypass boxes to verify that they are accessible and their controls are connected and functioning.

K. Examine equipment for installation and for properly operating safety interlocks and controls.

1. Integrity of dampers for free and full operation and for tightness of fully closed and fully open positions.
2. Thermostats are located to avoid adverse effects of sunlight, drafts, and cold walls.
3. Sequence of operation for control modes is according to the Contract Documents.
4. Controller set points are set at indicated values.
5. Interlocked systems are operating.
6. Changeover from heating to cooling mode occurs according to indicated values.

L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:

1. Permanent electrical power wiring is complete.
2. Automatic temperature-control systems are operational.
3. Equipment and duct access doors are securely closed.
4. Balance, smoke, and fire dampers are open.
5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

B. Cut ducts and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

D. Check airflow patterns through the supply-fan discharge and mixing dampers.

E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

F. Verify that motor starters are equipped with properly sized thermal protection.

G. Check dampers for proper position to achieve desired airflow path.

H. Check for airflow blockages.

I. Check condensate drains for proper connections and functioning.

J. Check for proper sealing of air-handling unit components.

K. Check for proper sealing of air duct system.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

    a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.
    b. Measure static pressure directly at the fan outlet or through the flexible connection.
    c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.

d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up the rooftop units.

a. Simulate dirty filter operation and record the point at which maintenance personnel must change filters.

3. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors with calculated system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.
4. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure static pressure at a point downstream from the balancing damper and adjust volume dampers until the proper static pressure is achieved.

a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

2. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure terminal outlets and inlets without making adjustments.

1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust terminal outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using volume dampers rather than extractors and the dampers at air terminals.

1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer, model, and serial numbers.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

3.7 PROCEDURES FOR HEAT-TRANSFER COILS

A. Electric-Heating Coils: Measure the following data for each coil:

1. Nameplate data.
2. Airflow.
3. Entering- and leaving-air temperature at full load.
4. Voltage and amperage input of each phase at full load and at each incremental stage.
5. Calculated kilowatt at full load.
6. Fuse or circuit-breaker rating for overload protection.

B. Refrigerant Coils: Measure the following data for each coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

3.8 PROCEDURES FOR TEMPERATURE MEASUREMENTS

A. During TAB, report the need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of two successive eight-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.9 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Check the operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Check free travel and proper operation of control devices such as damper operators.

F. Check the sequence of operation of control devices.

G. Check the interaction of electrically operated switch transducers.

H. Check the interaction of interlock and lockout systems.

I. Record voltages of power supply and controller output. Determine whether the system operates on a grounded or nongrounded power supply.

J. Note operation of electric actuators using spring return for proper fail-safe operations.

3.10 TOLERANCES

A. Set HVAC system airflow within the following tolerances:

1. Supply, Return and Equipment with Fans: Plus 5 to plus 10 percent.
2. Air Outlets and Inlets: 0 to minus 10 percent.

3.11 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in three-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.

1. Include a list of instruments used for procedures, along with proof of calibration.

C. Final Report Contents: In addition to certified field report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance, but do not include Shop Drawings and Product Data.

D. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:

1. Title page.
2. Name and address of TAB firm.
3. Project name.
4. Project location.
5. Engineer's name and address.

6. Contractor's name and address.
7. Report date.
8. Signature of TAB firm who certifies the report.
9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
10. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

11. Nomenclature sheets for each item of equipment.
12. Data for terminal units, including manufacturer, type size, and fittings.
13. Notes to explain why certain final data in the body of reports varies from indicated values.
14. Test conditions for fans and pump performance forms including the following:

    a. Settings for outside-, and return-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Settings for supply-air, static-pressure controller.
    g. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outside, supply, and return, airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Balancing stations.
5. Position of balancing devices.

F. Roof top Unit Test Reports: For roof top units with coils, include the following:

1. Unit Data: Include the following:

    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches, and bore.
    i. Sheave dimensions, center-to-center, and amount of adjustments in inches.

j. Number of belts, make, and size.
k. Number of filters, type, and size.

2. Motor Data:

a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Outside airflow in cfm.
g. Return airflow in cfm.
h. Outside-air damper position.
i. Return-air damper position.

G. Electric-Coil Test Reports: For electric coils installed in roof top unit include the following:

1. Unit Data:

a. System identification.
b. Location.
c. Coil identification.
d. Capacity in Btuh.
e. Number of stages.
f. Connected volts, phase, and hertz.
g. Rated amperage.
h. Airflow rate in cfm.
i. Face area in sq. ft..
j. Minimum face velocity in fpm.

2. Test Data (Indicated and Actual Values):

a. Heat output in Btuh.
b. Airflow rate in cfm.
c. Air velocity in fpm.
d. Entering-air temperature in deg F.
e. Leaving-air temperature in deg F.
f. Voltage at each connection.
g. Amperage for each phase.

H. Fan Test Reports: For supply fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Sheave dimensions, center-to-center, and amount of adjustments in inches.

2. Motor Data:

a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
g. Number of belts, make, and size.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

I. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft..
g. Indicated airflow rate in cfm.
h. Indicated velocity in fpm.
i. Actual airflow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

J. Air-Terminal-Device Reports:

1. Unit Data:

a. System and roof top unit identification.
b. Location and zone.
c. Test apparatus used.
d. Area served.
e. Air-terminal-device make.
f. Air-terminal-device number from system diagram.
g. Air-terminal-device type and model number.
h. Air-terminal-device size.
i. Air-terminal-device effective area in sq. ft..

2. Test Data (Indicated and Actual Values):

a. Airflow rate in cfm.
b. Air velocity in fpm.
c. Preliminary airflow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final airflow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

3.12 INSPECTIONS

A. Final Inspection:

1. After initial inspection is complete and evidence by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer.
2. TAB firm test and balance engineer shall conduct the inspection in the presence of Owner and Engineer.
3. Engineer shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
6. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
7. Request a second final inspection. If the second final inspection also fails, Owner shall contract the services of another TAB firm to complete the testing and

balancing in accordance with the Contract Documents and deduct the cost of the services from the final payment.

END OF SECTION 15950

INDEX

DIVISION 16 - ELECTRICAL WORK

SECTION 16000 - GENERAL PROVISIONS, ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions and Division 1 Specification Sections apply to work of this section and all other Division 16 specification sections.

B. This section applies to all Division 16 specification sections.

1.2 SUMMARY

A. This section includes general administrative and procedural requirements for electrical installations to expand the requirements of the General Conditions and Division 1 Specification Sections.

1.3 STANDARDS

A. The following industry standards are considered minimum requirements for electrical work and are made a part of the contract documents:

1. National Electrical Code, 2005 Edition (NEC)
2. Electrical Ordinances of Local Governing Authority
3. Utah State Fire Marshal's Rules and Regulations
4. International Building Code
5. International Fire Code
6. Underwriters Laboratories (UL) Standards
7. American National Standards Institute (ANSI)
8. National Electrical Manufacturer's Association (NEMA)
9. National Fire Protection Association (NFPA) Standards
10. Regulations of American Standards Association

B. If any conflict occurs between these rules and the contract documents or between the plans and specifications, notify the Architect promptly in writing. Do not proceed with any work in conflict until a solution is approved in writing by the Architect.

1.4 WORKMANSHIP

A. All Electrical Work of any nature shall be performed by qualified electricians, experienced in the type of work to be performed and licensed with the State of Utah. Electricians shall show their license upon request of the Owner, Architect and/or their representatives.

1.5 INSPECTIONS

A. Coordinate with DFCM Project Manager and General Contractor for required Code Inspections.

1.6 ELECTRICAL WORK INCLUDED

A. The basic contract work includes all labor, material, tools, transportation, equipment, and superintendence specified, indicated on the drawings or necessary to make a complete installation of, but not limited to, the following:

1. Appliances, apparatus and materials not specifically noted on drawings or mentioned herein, but which are necessary to make a complete working installation of all electrical systems required for the project.

2. Hangers, anchors, sleeves, chases, supports and fittings as may be required and as indicated.

3. Branch circuits for power and lighting with raceway system and outlet boxes.

4. All luminaires, wall switches, receptacles, etc. as indicated on drawings.

5. Electrical service to heating, ventilating and air conditioning equipment.

6. Lightning protection system additions and modifications.

7. Fire Alarm System additions and modifications, complete with all equipment in operative condition.

8. Security System outlets and raceway system, ready for installation of wires and equipment by others.

9. Telephone/Data outlets and raceway system, ready for installation of wires and equipment by others.

1.7 SUBSTITUTIONS

A. Material or products specified by name of manufacturer, brand or trade name or catalogue reference will be the basis of the bid and furnished under the contract unless changed in writing by the Architect. Where two or more materials are named, the choice of these will be optional with the Contractor.

B. Submit requests for substitution in writing to the Architect with copy to Consulting Engineer, in accordance with the General Conditions.

1.8 ACCURACY OF DATA

A. Data given herein and on the drawings are as exact as could be secured, but their absolute accuracy is not guaranteed. Specifications and drawings are for the assistance and guidance of the Contractor.

B. Electrical drawings are diagrammatic, but will be followed as closely as building construction and work of other contractors will permit. All deviations from the drawings required to make the Electrical Work conform to the building as constructed and to the work of other contractors will be made by the Contractor as approved by the Architect.

1.9 VISIT THE SITE

A. Contractors are assumed to have visited the site and thoroughly acquainted themselves with conditions affecting the proposed work. Verify existing conditions and measurements at the building before beginning work and immediately notify the Architect of any discrepancies which may adversely affect completion of the work.

1.10 TEMPORARY POWER

A. Provide temporary power for reasonable convenience during construction in accordance with the General Conditions.

B. Provide GFCI Protection for all temporary power outlets.

C. Use temporary power for construction purposes only. Do not use temporary power for electric

space heating, etc..

1.11 SHOP DRAWING SUBMITTALS

A. As soon as possible after contract award, submit shop drawings for review in accordance with the General Conditions and Division 1 Specifications.

B. Submit shop drawings in three ring loose-leaf binder.

C. Divide Electrical equipment into subsections of common equipment such as wiring devices, lighting fixtures, panelboards, starters, etc.. Provide a complete equipment list at the beginning of each subsection.

D. Provide manufacturers' catalogue and/or descriptive literature indicating specific model and/or catalog numbers, options, accessories and modifications for the following items:

1. Wiring Devices and Occupancy Sensors
2. Safety Switches
3. Circuit Breakers
4. Light Fixtures
5. Lightning Protection System
6. Fire Alarm System

E. Above list is considered minimum. Additional items may be required to be submitted for review.

F. Refer to individual Specification Sections for additional Shop Drawing Submittal requirements.

1.12 RECORD DRAWINGS

A. Provide As-Built Record Drawings in accordance with the General Conditions and Division 1 Specifications.

B. Indicate all changes made to the drawings such as changes in fixture and outlet location, changes in circuit routing and circuit numbering, etc. Include all changes by Addenda, Change Order, Supplemental Instruction or verbal instruction.

C. Refer to individual Specification Sections for additional Record Drawing requirements.

1.13 OPERATION AND MAINTENANCE MANUALS

A. Provide Operation and Maintenance Manuals in accordance with the General Conditions and Division 1 Specifications.

B. Include manufacturers' catalog and/or descriptive literature of equipment actually installed. Clearly indicate on literature the specific model and/or catalog numbers of equipment installed, including all options, accessories and/or modifications.

C. All copies of literature will be new, clean and clearly legible. Sheets used for shop drawing submittals with review stamp, remarks, etc., will not be acceptable.

D. Divide Electrical equipment into subsections of common equipment such as wiring devices, lighting fixtures, panelboards, starters, etc.. Provide a complete equipment list and recommended maintenance schedule at the beginning of each subsection.

E. Refer to individual Specification Sections for additional Operation and Maintenance Manual requirements.

1.14 WARRANTY

A. Provide Warranty for Electrical Work in accordance with the General Conditions and Division 1 Specifications.

B. Provide manufacturer's warranty for all equipment which the manufacturer normally provides a warranty in excess of twelve months. Refer to individual Specification Sections for extended warranty requirements.

1.15 EXTRA MATERIAL STOCK

A. Provide extra stock in original cartons, or packaged with protective coverings, for storage and identified with labels clearly describing contents.

B. Turn over extra stock to Owner and place in storage prior to Substantial Completion. Exact location of storage to be determined by the Owner.

C. Obtain signed receipt for extra stock materials from the Owner’s Project Manager. Include copy of signed receipt in the Project Operation and Maintenance Manuals.

D. Provide the following extra stock of materials to the Owner.

1. Fuses: refer to Specification Section 16440 - Fuses for required quantities.

2. Fixture lenses, louvers, diffusers, and lamps: refer to Specification Section 16500 - Lighting for required quantities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials and equipment for which U.L. Standards have been established, will be listed by and bear the label of Underwriters Laboratories, Inc..

B. All materials will be new and bear the manufacturer's name, trade name and catalog or model numbers. Similar items will be of the same manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation of materials will comply with all codes and be accomplished with good workmanship in the judgement of the Architect and Consulting Engineer.

3.2 COOPERATION WITH OTHER CONTRACTORS

A. Cooperate with other contractors doing work on the building as may be necessary for the proper execution of the work of various trades employed in construction of the building.

B. Refer to architectural, structural, and mechanical drawings, for construction details, and coordinate the electrical work with that of other contractors to the end that unnecessary delays and conflicts will be avoided.

3.3 MATERIAL HANDLING

A. Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

3.4 CUTTING AND REPAIRING

A. Provide all required digging, cutting, etc. incidental to the Electrical Work. Make required repairs thereafter to the satisfaction of the Architect.

B. Do not cut into any major structural element, beam or column, without written approval of the Architect.

C. Install the Electrical Work to proceed with other trades in order to avoid unnecessary cutting of the construction.

3.5 CONSTRUCTION REVIEW

A. The Owner, Architect and/or Consulting Engineer will perform construction review throughout the construction of the project. The construction review does not relieve the contractor from the responsibility of providing all materials and performing the work in accordance with the Contract Documents.

B. Notify the Architect in writing, giving ample notice, at the following stages of construction and allow the Owner, Architect and/or Engineer to review the installed work.

1. When all electrical rough-in is complete, but not covered.
2. Pre-Final, upon completion of all electrical work.
3. Final, upon completion of all items noted in the Pre-Final Construction Review Report.

C. Prerequisite for Final Electrical Construction Review:

1. Electrical Engineer/Consultant must be present.
2. Electrical Contractor's job foreman must be present.
3. DFCM Representative must be present.
4. Fire Alarm System Manufacturer's Representative must be present.
5. Fire Marshal’s representative must be present.
6. All modified Panelboard Enclosures must be open.
7. Clear access must be provided to all devices and equipment.
8. All panels, disconnects, etc. must be labeled and typed panel index cards installed.
9. All light fixtures, outlets, equipment, etc., must be energized and operable.
10. Contractor must have pad and pencil to list all deficient items.
11. Make all corrections and adjustments after the Final Construction Review, not during. Items requiring correction will appear on the Final Construction Field Report.
12. Contractor must have all required keys to provide access to all panels and doors.

D. Test all systems and equipment provided and/or connected under the Contract for short circuits, ground faults, proper neutral connections and proper operation in the presence of the Owner, Architect and/or Engineer.

E. The entire construction will be installed in accordance with the contract documents and be free of mechanical and electrical defects prior to final acceptance of the work.

* END OF SECTION 16000 *

SECTION 16060 - MINOR ELECTRICAL DEMOLITION FOR REMODELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

B. Division 1 Demolition Sections.

1.2 SCOPE

A. Remove electrical equipment and wiring systems and make required extensions and reconnections as shown on Drawings and specified herein.

B. Repair all damage resulting from demolition and extension work.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Provide new materials and equipment for patching and extending work as specified in the appropriate Specification Section for the materials and equipment involved.

B. Where materials or methods not included in the Specifications are required, provide materials and methods in accordance with normal construction industry standards and as approved by the Architect and/or Engineer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field verify existing measurements and circuiting arrangements are as shown on Drawings.

B. Verify that abandoned wiring and equipment serve only abandoned facilities.

C. Demolition Drawings are based on field observation of existing surface conditions and available existing building electrical drawings. Report discrepancies to Architect before disturbing existing installation.

D. All demolition and extension work is not necessarily indicated on Drawings. Include all such work without additional cost to Owner.

3.2 PREPARATION

A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.

B. Coordinate utility service outages with Utility Company.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use electricians experienced in such operations.

D. Protect all existing electrical equipment to remain from damage during demolition and new construction. Survey all existing equipment prior to beginning work and document in writing and

by photograph any existing damage to existing equipment.

3.3 DEMOLITION

A. Coordinate with Owner for equipment and materials to be removed by Owner or salvaged by the contractor for Owner. Place salvaged equipment and materials in storage at the project site as directed by the Owner.

B. Legally dispose of all removed equipment and materials not salvaged for the Owner.

1. Existing fluorescent lamp ballasts are assumed to be free of PCBs. The contractor shall verify that ballasts are free of PCBs with the ballast manufacturer prior to disposal. Any additional cost for hazardous material disposal will be negotiated under the change order provisions of the contract, or the Owner will assume responsibility for legal disposal of the ballasts.

C. Remove abandoned wiring to source of supply, i.e. panelboard, circuit breaker, etc..

D. Remove accessible abandoned conduit, cables, junction boxes, etc., including above accessible ceilings. Cut conduit flush with walls and floors.

E. Disconnect abandoned outlets and remove devices. Remove abandoned outlet boxes and conduit servicing them where indicated on drawings. Provide blank cover for abandoned outlets which are not indicated to be removed.

3.4 EXTENSION OF EXISTING ELECTRICAL WORK

A. Reconnect existing equipment where demolition interrupts existing branch circuits or feeders to the equipment.

B. Repair adjacent construction and finishes damaged during demolition and extension work to match surrounding surfaces.

C. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

D. Extend existing installations using materials and methods as specified for new work. Remove and replace existing installations which are not compatible with new work.

3.5 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide new typed circuit directory showing revised circuiting arrangement.

C. Luminaries: Remove existing luminaries for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps and broken electrical parts.

3.6 INSTALLATION

A. Install relocated materials and equipment as required for new materials and equipment.

3.7 OUTAGES

A. Maintain Existing Electrical Systems in service until new systems are complete and ready for

service. Disable systems only to make switchovers and connections. Minimize outage duration.

B. Obtain permission from Owner before partially or completely disabling systems in accordance with Division 1 Specification Sections.

* END OF SECTION 16060 *

SECTION 16110 - RACEWAYS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide a complete raceway system for all wiring as shown on the drawings and as specified herein.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. Provide minimum 3/4" trade diameter raceways for all wiring systems.

1. Minimum 1/2" trade diameter raceways may be used for remote control, signaling and power-limited circuits which meet the requirements of National Electrical Code Article 725 as allowed in other Specification Sections and/or as approved by the Architect.

B. Do not use aluminum conduit, intermediate steel conduit (IMC), BX cable, MC cable, Flexible Non-metallic Tubing, NM cable, Direct Burial Cable or any other wiring methods not allowed by this specification unless approved in writing by the Architect and/or Engineer.

2.2 ABOVEGROUND RACEWAYS

A. Provide Electrical Metallic Tubing (EMT), galvanized inside and out, for raceways not subject to permanent moisture or damage.

B. Provide Galvanized Rigid Steel Conduit (GRC) where raceways are subject to permanent moisture such as underground, or damage such as vehicular traffic, etc..

2.3 FLEXIBLE RACEWAY CONNECTIONS

A. Provide Flexible Steel Conduit for final connection to lay-in light fixtures, motors and other equipment subject to vibrations or movement, not to exceed 6 feet for fixture connections and 3 feet for motor and equipment connections.

B. Provide liquid-tight flexible steel conduit outside and in wet, humid, corrosive and oily locations.

1. Provide Sunlight Resistant liquid-tight flexible steel conduit outdoors.

C. Provide a ground conductor in all flexible steel conduit.

D. Flexible Steel Conduit may be used where misalignment or cramped quarters exist only with prior approval of the Architect and/or Engineer.

E. Minimum 1/2" flexible steel conduit or 3/8" factory fabricated fixture whips may be used to make final connections to lay-in light fixtures.

F. Flexible Steel Conduit may be used to fish through existing walls and ceilings only with prior approval of the Architect and/or Engineer.

2.4 CONDUIT FITTINGS

A. Provide steel compression type or steel set screw type fittings for Electrical Metallic Tubing.

B. Provide malleable iron clamp type fittings for Flexible Steel Conduit.

C. Provide steel compression type fittings for Liquid-Tight Flexible Steel Conduit.

D. Provide threaded fittings for GRC conduit. Provide double locknuts and plastic bushing for GRC conduit terminations or provide boxes and enclosures with threaded hubs.

E. Provide steel rain-tight, compression type fittings for all conduit installed outside and in wet, humid, corrosive and oily locations.

F. Provide Insulated Throat Connectors for all conduit terminations 1" diameter and smaller. Provide insulating bushings for all conduit terminations 1-1/4" diameter and larger.

G. Provide Grounding Bushings bonded to the electrical system ground:

1. On each end of all conduits used to protect ground conductors.

2. On all conduit terminations installed in concentric or eccentric knockouts or where reducing washers have been installed.

H. Do not use cast metal or indenter type fittings. Do not use screw-in type fittings for Flexible Steel Conduit. Do not use spray (aerosol) PVC cement.

2.5 RACEWAY SEALS

A. Seal all conduit penetrations through fire rated walls, ceilings and floors with a UL classified fire barrier system in accordance with Division 7 Specification Requirements.

B. Seal all conduit penetrations through airtight spaces and plenums with an approved mastic compound acceptable to the Architect to prevent air leakage.

2.6 ROOF PENETRATIONS

A. Provide Galvanized Steel or Lead roof jacks of suitable style and material for all conduit penetrations through roof to provide a weathertight seal in accordance with the applicable Roofing Specification Sections. Coordinate style, material and installation with the roofing contractor.

2.7 PULL BOXES

A. Provide pull boxes or conduit bodies in accessible locations where required to reduce the number of bends in the conduit run to less than 360 degrees and at points not exceeding 100 feet in long branch circuit conduit runs.

1. Indicate exact location of pull boxes and conduit bodies on the As-Built Record Drawings.

2.8 PULL STRING

A. Provide a nylon or polypropylene pull string with not less than 200 lb tensile strength in all spare conduits and conduits installed for use by others. Provide a hard cardboard tag for each raceway to indicate location of the opposite end of the raceway.

PART 3 - EXECUTION

3.1 SUPPORTS

A. Securely support all raceways with full (2 hole) pipe straps, hangers, or ceiling trapeze directly from building structure such as roof trusses, beams, floor joists, etc., in accordance with Specification Section 16190 - Supporting Devices.

1. Do not support raceways from other electrical systems or mechanical systems.

B. Provide supports at 5'-0" on center with a minimum of two supports for each ten foot length of conduit or fraction thereof up to 6 feet.

C. Provide a support within 12" of each coupling, fitting, box, enclosure and bend.

1. Install supports at vertical to horizontal conduit bends on the upper side of the bend.

3.2 INSTALLATION

A. Raceway layouts on the drawings are generally diagrammatic and the exact routing of raceways will be governed by structural conditions and the work of other contractors.

B. Install raceways concealed within finished ceilings, walls and floors except where exposed raceways are specifically shown on the drawings or permitted by the Architect.

C. Install exposed raceways parallel with or perpendicular to walls and ceilings, with right angle turns consisting of symmetrical bends or conduit bodies equal to Crouse-Hinds "Condulet". Avoid all bends and offsets where possible.

1. Paint exposed raceways to match surrounding surfaces in accordance with Division 9 Specification Sections.

D. Install raceways minimum 12" from insulation of hot water piping, steam piping and other systems or equipment with temperatures in excess of 104^0 F (40^0 C).

E. Make all field bends and offsets with a radius not less than allowed by the National Electrical Code for the type of raceway system.

1. Do not install bends or offsets which are flattened, kinked, rippled or which destroy the smooth internal bore or surface of the conduit.

F. Cap the open ends of raceways during construction to prevent the accumulation of water, dirt or concrete in the raceways. Thoroughly clean raceways in which water or other foreign matter has been permitted to accumulate or replace the raceway where such accumulation cannot be removed by a method approved by the Architect and/or Engineer.

G. Do not install raceways which have been crushed or deformed in any manner.

H. Do not install wiring until work which might cause damage to the wires or raceways has been completed.

* END OF SECTION 16110 *

SECTION 16120 - CONDUCTORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide all conductors for power and lighting as shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Provide Copper building wire, minimum #12 AWG, with type THHN/THWN or XHHW 600 volt insulation, except as otherwise noted on the drawings or required by NEC.

1. Provide conductors in underground raceways with insulation approved for wet locations such as type THWN or XHHW.

B. Provide stranded conductors for wires #8 AWG and larger and for terminal connections to all motors. Stranded or solid conductors may be used for sizes smaller than #8 AWG at the contractor's option.

C. Provide conductors rated 90^0 C minimum in wiring channels of Fluorescent and High Intensity Discharge lighting fixtures.

D. Provide conductors with surface printed identification showing conductor size and material, insulation type, voltage rating and approvals at regularly spaced intervals of 24".

E. Do not use sizes smaller than #12 AWG in branch circuits carrying load. Circuits requiring larger sizes to meet voltage drop conditions, etc., are indicated on the drawings.

1. Where branch circuit homeruns indicate conductor size, use that size conductor for the entire branch circuit, including switch legs, etc.

F. Do not use aluminum conductors.

2.2 SPLICES

A. Provide Ideal wirenuts or Scotchlock spring connectors for all conductor splices #8 AWG and smaller. Provide split-bolt or compression type connectors for all conductor splices larger than #8 AWG.

B. Provide splices which are UL listed for the type, quantity and size of the conductors to be spliced.

C. Provide all splices with insulation at least equal to that of the conductor.

D. Provide watertight splices in junction or outlet boxes located outside and in wet locations. Provide heat shrink insulating kits or use connectors pre-potted with an approved waterproof compound.

E. Splice conductors only in approved boxes.

F. Do not splice conductors in conduit bodies, panelboard enclosures, switchboard enclosures, or similar locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all conductors in approved raceway systems.

B. Install branch circuit conductors continuous without splice from panelboards to fixture outlet boxes, device terminals, etc..

1. Provide suitable pull boxes in readily accessible locations where necessary at intermediate points of branch circuits. Indicate exact location of all boxes on the As-Built Record Drawings.

C. Do not install wiring until work which might cause damage to the wires has been completed.

3.2 COLOR CODING AND IDENTIFICATION

A. Color code all wiring at each enclosure and box where conductors are accessible and at each splice, tap or termination by means of colored conductor insulation.

1. For conductors #6 AWG and larger, colored self-adhesive tape with the appropriate color designations may be used.

B. Color code each conductor of each circuit as follows.

1. Ground: Green or Bare Copper

2. 120/208 Volt, 3 Phase, 4 Wire System
   a. Phase A - Black
   b. Phase B - Red
   c. Phase C - Blue
   d. Neutral - White

3. 277/480 Volt, 3 Phase, 4 Wire System
   a. Phase A - Brown
   b. Phase B - Yellow
   c. Phase C - Violet
   d. Neutral - Gray

4. Match existing conductor color coding if different than above.

C. Color code switch legs and travelers according to phase with colors other than used for phase conductors, to be consistent throughout the project.

3.3 IDENTIFICATION

A. Provide conductor identification in accordance with Specification Section 16195 - Electrical Identification.

3.4 MULTI-WIRE BRANCH CIRCUITS

A. Where a common neutral is run for multi-wire branch circuits, connect phase conductors to separate phases such that the neutral conductor will carry only the unbalanced current. Use neutral conductors of the same size as the phase conductors unless specifically noted otherwise.

B. Do not install more than three phase conductors in any raceway except where specifically shown on the drawings or approved by the Architect and/or Engineer.

3.5 PHASE ROTATION

A. Phase rotation for Three Phase System will be A leads B Leads C from front to back, from left to right or from top to bottom as viewed from the front of the enclosure.

* END OF SECTION 16120 *

SECTION 16130 - ELECTRICAL BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide junction boxes and outlet boxes at each outlet, fixture and other device location as shown on drawings and as specified herein.

PART 2 - PRODUCTS

2.1 OUTLET AND DEVICE BOXES

A. Provide galvanized or cadmium plated sheet steel electrical boxes in indoor dry locations, of the most suitable size and shape for the conditions encountered and in accordance with NEC requirements for the number of conductors allowed.

B. Provide minimum 4" Square or Octagonal, 1-1/2" Deep Boxes unless specifically indicated otherwise on the drawings.

1. Provide minimum 4" Square or Octagonal, 2-1/8" Deep Boxes where Three (3) conduit connections are required.

2. Provide minimum 4-11/16" Square, 2-1/8" Deep Boxes where Four (4) or more conduit connections are required.

3. Provide gang boxes where more than one device is located at the same point.

4. Boxes smaller than 4" Square or Octagonal, even though of equivalent cubic inch capacity, are not acceptable.

C. Provide Type FD cast metal boxes outside, in wet, humid or corrosive locations and where exposed to damage such as vehicular traffic.

D. Confer with the various equipment suppliers and either use or properly provide for boxes which are furnished with the equipment, such as speakers, horns, bells, etc..

E. Do not use "THRU-THE-WALL" boxes, sectional (gangable) boxes or non-metallic boxes.

2.2 JUNCTION BOXES

A. Provide junction boxes as specified for outlet and device boxes except that boxes 6" square and larger may be painted sheet steel.

2.3 BOX ACCESSORIES

A. Provide fittings, plaster rings, cover plates and other accessories suitable for the purpose and location of each box.

B. Provide plaster rings which are minimum 1/8" deeper than wall covering for flush mounted boxes (i.e. use 3/4" plaster ring for 5/8" gypsum board wall covering) such that plaster ring will be flush

with finished face of wall.

C. Provide industrial raised covers for surface mounted outlet and device boxes.

PART 3 - EXECUTION

3.1 SUPPORTS

A. Support each box from the building structure independent of the raceway system.

B. Support flush mounted wall boxes with metal bar hangers or metal stud backing behind the box secured to wall studs.

C. Support flush mounted ceiling boxes with metal bar hangers secured to ceiling support system or threaded rod hangers secured to structure.

1. Secure boxes for box supported fixtures to the building structure with suitable anchors capable of supporting not less than 200 lbs or 4 times the fixture weight, whichever is greater.

D. Secure surface mounted boxes to building structure with minimum of 2 screws or bolts as required.

E. Do not use side mounted boxes or brackets.

3.2 INSTALLATION

A. Install flush mounted boxes, after being equipped with extensions, accessories, etc., flush with finished face of wall, ceiling or floor.

1. Replace or repair all boxes not installed flush with finished surfaces to the satisfaction of the Architect and/or Owner.

2. In order to meet this requirement, it is recommended that the Electrical Contractor be present during installation of gypsum board, tile or other wall coverings.

3. Coordinate depth of wall coverings to be installed on all walls with the General Contractor prior to installing plaster rings.

B. Install boxes in opposite sides of common room walls in adjacent stud spaces where possible and with minimum 6" separation between the boxes. Provide minimum 10" of conduit between boxes which are connected by conduit.

C. Install outlet boxes for light switches on the strike side of door openings. Coordinate door swings with the General Contractor prior to roughing in switch boxes.

D. Seal around the surface of all switch and outlet boxes with plaster or grout to close any opening between the outlet box and the wall finish.

E. Install boxes level and plumb.

3.3 LOCATIONS

A. The wiring system layouts on the drawings are generally diagrammatic and the location of outlets and equipment are approximate.

B. Study all available drawing details, shop drawings, equipment drawings, building conditions and

materials surrounding each outlet and device box prior to installing the box to ascertain the exact location required for each box.

C. Rough in the electrical work such that electrical outlets, fixtures and other fittings are properly fitted to the work of other trades.

D. Do not install boxes inside cupboards, behind drawers, or otherwise so located, as to be inaccessible or unsuited for the purpose intended.

E. The right is reserved to make any reasonable change in the location of the outlets before roughing in, without involving additional expense.

3.4 MOUNTING HEIGHT

A. Install outlet and device boxes at the heights shown on the drawings or as directed by the Architect. In general, mount outlets as follows.

1.	Convenience Outlet	18"
2.	Wall Switch	46"
3.	Telephone/Data Outlet	18"
4.	Fire Alarm Pull Station	46"
5.	Fire Alarm Horn/Strobe	84"
6.	Exit Lights	8'-0"

B. All mounting heights, including mounting heights indicated on drawings, are to the center of the outlet box above finished floor or grade unless noted otherwise.

C. Install outlets above counters 4" above the top of the counter backsplash to the center of the outlet. Coordinate mounting heights with the cabinet installer prior to roughing in the outlets.

D. Refer to applicable Specification Sections for mounting heights of devices and equipment not included above or install at heights as directed by the Architect and/or Engineer.

* END OF SECTION 16130 *

SECTION 16140 - OUTLETS AND WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide all wiring devices complete with coverplates and necessary accessories as shown on the drawings and as specified herein.

1.3 SUBMITTALS

A. Provide submittals for each type of wiring device to be used on the project in accordance with Division 1 Specifications and Section 16000 - General Provisions, Electrical to verify compliance with the contract documents.

PART 2 - PRODUCTS

2.1 WIRING DEVICES

? A. Provide wiring devices rated 20 amps minimum, as specified below, or equivalent of Eagle, General Electric, Hubbell, Leviton or Pass & Seymour.

1.	Switch, Single Pole	Bryant 4901
2.	Switch, 3 - Way	Bryant 4903
3.	Receptacle, duplex convenience, 3-wire	Bryant 5352
4.	Receptacle, duplex, isolated ground	Bryant 5362-IG
5.	Receptacle, duplex, GFCI protected	Bryant GFR53FT

B. Color of devices in finished areas will be as selected by the Architect from the manufacturer's standard colors to compliment the color of architectural finishes.

C. Provide convenience outlets with GFCI protection in accordance with NEC requirements, where installed outside or within 6 feet of any sink and as indicated on the drawings.

1. Provide a self-adhesive printed label stating "GFCI PROTECTED" for each outlet protected by feed-through GFCI receptacles or GFCI circuit breakers.

2. Use feed-through GFCI outlets only to protect other outlets within sight of the GFCI protected outlet.

2.2 COVERPLATES

A. Provide a cover plate for each outlet and box suitable for the location and function of the outlet and box.

B. Provide blank cover plates for junction boxes and outlet boxes not used.

C. Provide nylon or impact resistant thermoplastic coverplates for outlets and boxes installed in finished areas, of the same manufacturer and color as the wiring devices.

D. Provide UV Stabilized Polycarbonate, "Raintight While In Use" coverplates with spring return lids

and suitable gasket as manufactured by Eagle or Taymac for all devices installed outside or in wet locations.

2.3 OCCUPANCY SENSORS

A. Provide ultrasonic, infrared, or dual technology type occupancy sensors, as specified below, to control lighting in rooms as indicated on the drawings.

1. Wall switch Novitas 01-211
   a. Coverage suitable for use in offices or rooms up to 300 sq. ft.
   b. 120/277 Volt field selectable circuit voltage rating.
   c. Contact ratings:
      (1) 6.7 Amps, 120 VAC, Tungsten or Ballast. (Approximately 800 Watts)
      (2) 4.3 Amps, 277 VAC, Ballast. (Approximately 1,200 Watts)
   d. Automatic/Manual selector switch to allow automatic or manual operation of the room lighting. Lighting shall turn off automatically after the pre-set time delay in either the automatic or manual mode.

2. Wall Switch, Dual Level Novitas 01-211
   a. Coverage suitable for use in offices or rooms up to 300 sq. ft.
   b. 120/277 Volt field selectable circuit voltage rating.
   c. Contact ratings:
      (1) 6.7 Amps, 120 VAC, Tungsten or Ballast. (Approximately 800 Watts)
      (2) 4.3 Amps, 277 VAC, Ballast. (Approximately 1,200 Watts)
   d. Automatic/Manual selector switch to allow automatic or manual operation of the room lighting. Lighting shall turn off automatically after the pre-set time delay in either the automatic or manual mode.
   e. Dual Level switching for separate control of two loads with one switch. Pushing the touchplate shall cycle through selection of the primary load, both loads, secondary load, and off.

B. Other acceptable manufacturers, subject to compliance with the contract documents are Honeywell, Hubbell, Leviton, Lightolier, Pass & Seymour, Tork, Uneco and Watt Stopper.

1. Occupancy sensors of other acceptable manufacturers may be ultrasonic, passive infrared or dual technology ultrasonic & passive infrared.

2.4 ACCESSORIES

A. Equip each outlet with devices suitable for the purpose of the outlet and with means of properly connecting the equipment served, whether or not such devices are specifically mentioned.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Properly locate each outlet to fulfill its particular purpose. Do not install receptacles or boxes inside cupboards, behind drawers, or otherwise so located, as to be inaccessible or unsuited for the purpose intended.

B. Install all outlets and wiring devices flush with face of coverplate, with the coverplate in contact with the finished face of the wall and with mounting strap of device in contact with the outlet box.

* END OF SECTION 16140 *

SECTION 16190 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide suitable supporting devices for all electrical equipment, raceways and components as specified herein and as shown on the drawings.

B. Refer to individual specification sections for additional supporting requirements.

PART 2 - PRODUCTS

2.1 SUPPORTING DEVICES

A. Provide support anchors which will support in tension a minimum of 4 times the weight of the equipment to be supported but not less than 100 lbs.

B. Provide wood screws in wood; toggle bolts in hollow masonry units; expansion bolts with lead shield or shot anchors in concrete and brick; and machine screws, threaded 'C' clamps or spring-tension clamps on steel work.

C. Do not use tie wire for support unless specifically called for in individual specification sections.

D. Do not use threaded C Clamps on tapered steel sections.

E. Do not weld supports, equipment, boxes, raceways, etc., to steel structures.

F. Do not use wooden plugs or plastic inserts as a base for supports.

G. Do not use shot anchors or drilled anchors of any kind in prestressed or post-tensioned concrete slabs and beams except as approved in writing by the Architect.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Secure supporting devices to building structure.

B. Do not install supporting devices with sheetrock or plaster as the sole means of support. Provide proper blocking behind the sheetrock or plaster as required to support equipment.

* END OF SECTION 16190 *

SECTION 16195 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide identification of all electrical equipment, devices, enclosures, conductors, cables, etc., as shown on the drawings and as specified herein.

B. Refer to individual specification sections for additional identification requirements.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Provide engraved laminated micarta or plastic nameplates to identify each panelboard, cabinet, motor starter, disconnect, etc., with the following minimum lettering heights:

1. Safety Switches, etc. - 1/4"

B. Provide Black Nameplates with White Lettering unless noted otherwise, or required to contrast with equipment enclosures.

C. Do not use Dynamo Labels, printed labels, etc., unless specifically called for in other specification sections or approved by the Architect and/or Engineer.

2.2 EQUIPMENT IDENTIFICATION

A. Provide engraved nameplates on the exterior of each Safety Switch, etc., to include the Equipment Description, Number or Designation, and the Circuit from which the equipment is served.

1. Example: ROOFTOP UNIT RTU-1
CIRCUIT M-10

B. Provide engraved nameplates on the exterior of feeder and other major junction boxes and pull boxes to indicate the function of the wiring within the box such as "PANEL 'A' FEEDER" or "FIRE ALARM PULLBOX".

2.3 PANELBOARD IDENTIFICATION

A. Provide nameplates on each Branch Breaker of Distribution Panelboards to indicate the Panel or Equipment served by the Branch Breaker and the location of the Panel or Equipment.

1. Example: ROOFTOP UNIT RTU-2
UHP DISPATCH AREA

2. Install the branch breaker nameplates on the wireway cover trim of panelboards. Do not install the nameplates on interchangeable dead-front trims.

2.4 CONDUCTOR IDENTIFICATION

A. Identify each branch circuit and each feeder conductor at each outlet box, pull box, or other accessible location with hand lettering in black India ink in the enclosure to indicate panel and circuit numbers of all conductors in the enclosure.

B. Identify individual conductors with self adhesive printed markers equal to Thomas & Betts "E-Z Code" markers in outlet boxes, pull boxes, or other accessible location according to the circuit number in outlet boxes, pull boxes, etc..

2.5 PANELBOARD CIRCUIT INDEX

A. Provide a neatly typed index, to include type of load served and the specific location of the load for each branch circuit of each panelboard.

1. Provide a new typed index for each existing panelboard in which branch circuits are added, removed, or modified to reflect all changes in circuiting.

B. Examples

1. Lighting, Southwest Conference Room
2. Lighting, 2nd Floor Conf. Rm and Office 208
3. Receptacles, SW Conf. Rm, west and north walls

C. Do not use room numbers shown on plans, use room numbers or nomenclature assigned to rooms by the Owner. Do not use remarks from panel schedules on drawing, the remarks are for the Contractor's reference only.

D. Include the panel designation and location of feeder breaker serving the panelboard at the top of the circuit index.

1. Example: PANEL 'RP2'
SERVED FROM ‘LP1'

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install nameplates to be visible from normal viewing angles.

B. Attach nameplates to equipment enclosures with stainless steel screws or rivets. Adhesives are not acceptable.

C. Install panel index behind protective plastic covering.

* END OF SECTION 16195 *

SECTION 16400 - SECONDARY SERVICE AND DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

PART 2 - PRODUCTS

2.1 SYSTEM

A. The Existing Secondary Electrical Distribution System is 277/480 Volt, Three Phase, Four Wire, 60 Cycle for HID Lighting, Fluorescent Lighting, and Equipment; and 120/208 Volt, Three Phase, Four Wire, 60 Cycle for Incandescent Lighting, Appliances and Outlets.

PART 3 - EXECUTION

3.1 POWER OUTAGES

A. Power outages to any portion of the existing building will not be allowed except on weekends, holidays and/or as directed by the Owner.

1. Submit written requests for power outages to the Owner not less than Seven (7) working days prior to all proposed outages.

2. Do not take any power outages without the Owners permission.

* END OF SECTION 16400 *

SECTION 16440 - SAFETY SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

B. Section 16475 - Fuses

1.2 SCOPE

A. Provide all disconnect switches required by NEC or local regulations as shown on drawings and specified herein.

1.3 SUBMITTALS

A. Provide shop drawing submittals for each Safety Switch type in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.

B. Include Manufacturer's standard published literature for each switch type. Clearly indicate all options, accessories, finishes, etc., to be provided with each switch type.

PART 2 - PRODUCTS

2.1 SAFETY SWITCHES

A. Provide NEMA KS1, Heavy Duty Type HD, horsepower rated, quick-make, quick-break enclosed load interrupter knife switches, fusible or non-fusible as required, with externally operable handle, lockable in the OFF position and interlocked to prevent opening front cover with switch in ON position.

B. Maximum voltage, current rating and horsepower rating will be clearly indicated on a metal plate riveted or otherwise permanently fastened to the switch enclosure.

C. Provide switches with NEMA 1 enclosures or where indicated as weatherproof, NEMA 3R enclosures.

D. Provide fusible switches rated 600 amps or less with a UL listed rejection feature to reject all fuses except Class R fuses.

2.2 ACCEPTABLE MANUFACTURERS

A. Acceptable safety switch manufacturers, subject to compliance with the contract documents, are Cutler Hammer, General Electric, Siemens, and Square 'D'.

PART 3 - EXECUTION

3.1 SUPPORTS

A. Provide a minimum of four supports, located at each corner of each switch enclosure. Where the enclosure exceeds 36 inches in any dimension, provide additional supports at 24 inches on center maximum.

3.2 MOUNTING HEIGHT

A. In general, mount safety switches 5'-0" above finished floor or grade to center of switch.

B. For exterior disconnects at condensing units or packaged rooftop units, mount top of switch at the same height as the top of the unit but not less than 24" above grade or roof to the bottom of the switch.

3.3 IDENTIFICATION

A. Provide an engraved nameplate for each switch in accordance with Section 16195 - Identification.

B. Provide adhesive tag on inside door of each fused switch indicating NEMA fuse class and rating installed.

* END OF SECTION 16440 *

SECTION 16450 - SECONDARY GROUNDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Ground all non-current carrying metallic parts of electrical equipment, raceway systems and the neutral conductor of the wiring system as shown on the drawings and specified herein.

PART 2 - PRODUCTS

2.1 GROUND CONNECTIONS

A. Make ground connections to the existing building ground system and extend to new electrical equipment, raceways, outlets, lighting, etc..

B. Bond the neutral conductor to electrical service ground system at the main transformer and the main service equipment only.

C. Bond all interior metallic piping systems to the electrical service ground system.

D. Make above ground connections by means of pressure connectors, compression connectors, clamps or other means which are UL Listed and classified as suitable for purpose.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Leave ground connections accessible for inspection.

B. Provide a separate ground terminal for each ground conductor in each panelboard, switchboard, and similar electrical equipment enclosures.

C. Provide an equipment grounding conductor in electrical raceways whether specifically noted on the drawings or not.

D. Install all grounding in accordance with the latest edition of the National Electrical Code.

* END OF SECTION 16450 *

SECTION 16470 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide new branch circuit breakers in existing panelboards to serve new branch circuits as shown on drawings.

1.3 SUBMITTALS

A. Provide shop drawing submittals for each new circuit breaker type in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.

B. Clearly indicate voltage, ampacities, breaker types, options, accessories, etc., to be provided with each circuit breaker. Include Series-Rated verification where required.

PART 2 - PRODUCTS

2.1 CIRCUIT BREAKERS

A. Provide thermal-magnetic type circuit breakers unless noted otherwise.

B. Provide multi-pole breakers with trip elements in each pole and common trip handle.

C. Provide "HACR" rated circuit breakers to serve heating, ventilating and air conditioning equipment branch circuits.

D. Provide "SWD" rated circuit breakers to serve all lighting and outlet branch circuits.

E. Provide new circuit breakers in existing panelboards of the same type and interrupting ratings as the existing circuit breakers. Provide new mounting hardware, connectors, dead front covers, etc., as required to install the new circuit breakers.

F. Plug-in breakers are not acceptable for use in panelboards.

2.2 INTERRUPTING RATING

A. The interrupting rating of circuit breakers shall be at least equal to the available short circuit current at the line terminals of the circuit breaker and correspond to the UL listed integrated short circuit current rating specified for the panelboards.

B. The minimum interrupting ratings of circuit breakers used as feeders and branches may be in accordance with UL 489 tested and certified series-connected circuit breaker combinations. All electrical equipment using the Series Rated circuit breaker combinations shall be clearly marked on the panel nameplate and feeder breaker indicating the same.

2.3 ACCEPTABLE MANUFACTURERS

A. Acceptable circuit breaker manufacturer is Siemens for installation in existing Siemens

panelboards and switchboards.

PART 3 - EXECUTION

3.1 IDENTIFICATION

A. Provide nameplates and neatly typed circuit index for each panelboard in accordance with Section 16195 - Electrical Identification.

* END OF SECTION 16470 *

SECTION 16475 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide fuses of the proper sizes and rating for each fusible switch as shown on the drawings and as specified herein.

PART 2 - PRODUCTS

2.1 FUSES

A. Provide UL Class L or UL Class R, current limiting fuses, rated for up to 200,000 amperes interrupting capacity.

1. For branch circuits feeding motors, furnish UL Class RK5, Time-Delay fuses and for branch circuits other than motors, furnish UL Class RK5 non time delay fuses.

B. Provide fuses which are a standard product of Bussman, Cefco, Gould/Shawmut, or Reliance.

2.2 SPARE FUSES

A. Provide a 20 percent complement, but not less than three, of each rating of each type of fuse used on the project. Turn over spare fuses to the Owner during or prior to Substantial Completion.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install only fuses of the same type and rating in each fusible switch.

3.2 COORDINATION

A. Coordinate fuse sizes for packaged mechanical equipment with mechanical contractor. Provide fuse sizes as indicated on the equipment nameplate.

* END OF SECTION 16475 *

SECTION 16480 - MOTOR STARTERS AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide motor starters, pushbutton stations, and other necessary operating devices for all Motors and Equipment as shown on the drawings and as specified herein.

B. Thermostats and similar control devices and control wiring for control of heating, ventilating and air conditioning equipment will be furnished and installed by the Controls Contractor under the provisions of Division 15 Specifications.

PART 2 - PRODUCTS

2.1 MOTORS

A. Unless otherwise noted herein or on the drawings, motors will be furnished under Division 15 Specification Sections.

B. In general, motors 1/2 HP and smaller will be Single-Phase rated at 115 or 120 volt. Motors and equipment larger than 1/2 HP will be Three-Phase with nameplate rating of 460 or 480 volt when used on a 277/480 volt system.

2.2 MOTOR STARTERS

A. Provide NEMA rated motor starters and control devices.

B. Do not use IEC rated motor starters and control devices.

2.3 MAGNETIC MOTOR STARTERS

A. Unless otherwise noted herein or on the drawings, magnetic motors starters will be furnished under Division 15 Specification Sections as part of packaged mechanical equipment.

PART 3 - EXECUTION

3.1 COORDINATION

A. Give special attention to wiring and controls for two-speed motors or motors with special controls at no additional cost to the Owner.

B. Determine exact location of all electrical devices controlling mechanical equipment in cooperation with the Mechanical Contractor in the field before roughing-in.

* END OF SECTION 16480 *

SECTION 16500 - LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. Provide all lighting fixtures, as shown on drawings and as described herein, complete with all necessary wiring, sockets, lamps, auxiliaries, supports, etc..

1.3 SUBMITTALS

A. Provide shop drawing submittals for each Fixture and Ballast type in accordance with Division 1 Specifications and Section 16000 - General Provision, Electrical to verify compliance with the Contract Documents.

B. Include Manufacturer's standard published literature for each fixture type. Clearly indicate all options, accessories, finishes, etc., to be provided with each fixture type.

C. Include Manufacturer's standard published literature for each ballast type to be used on the project. Provide literature for each ballast manufacturer which the fixture manufacturer may use depending upon availability at the time the fixtures are manufactured.

PART 2 - PRODUCTS

2.1 FIXTURES

A. Provide fixtures which comply with the appropriate Underwriters Laboratories (UL) Standards for the fixture type and which are UL Listed and UL Labeled.

B. Acceptable fixture manufacturers and types are indicated on the Fixture Schedule included with the Drawings.

1. Listing of the manufacturer's catalog numbers on the Fixture Schedule is intended to establish the general fixture type required and does not relieve the contractor and/or supplier from the responsibility to provide all accessories and options included in the fixture description nor from meeting the requirements of this specification.

C. Provide all recessed light fixtures with thermal protection in compliance with NEC Article 410-65 (c) and UL Test Standard 1571.

D. Provide individual fixtures with multiple ballasts as required to meet lamp switching requirements shown on the drawings.

2.2 FLUORESCENT BALLASTS

A. Provide UL Listed, CBM-Certified by ETL, Premium Class ‘P”, Solid State Electronic, fluorescent ballasts with Class 'A' sound rating which meet the energy efficient requirements of Public Law 100-357 (National Appliance Energy Conservation Amendment of 1988 to the Energy Policy and Conservation Act of 1987) for the lamp types to be served by the ballast.

B. Electronic Ballasts shall operate lamps at a frequency of 20 to 35 KHz with no detectable lamp

flicker, shall comply with FCC and NEMA limits governing EMI and RFI, and shall not interfere with the operation of other normal electric and electronic equipment.

C. Ballasts shall be potted, in a steel case and contain no PCBs. Operating temperature of the ballasts shall not exceed 60^0 C at any point on the case during normal operation.

D. Provide programmed rapid start fluorescent ballasts with the proper lamp circuit voltage and rating for the lamp types to be served by the ballast and with the following operating characteristics:

1.	Minimum Ballast Factor	0.88
2.	Minimum Power Factor	95%
3.	Maximum Total Harmonic Distortion (THD)	10%

E. Ballasts shall be marked with manufacturer's name, part number, supply voltage, power factor, open circuit voltage, current draw for each lamp type, UL listing, CBM Certification and Date of Manufacture Code.

F. Electronic Ballast Warranty shall be 5 Years from the "Date of Manufacture" Code on the ballast.

G. Fluorescent Ballasts shall be of U.S. Manufacture. Acceptable Manufacturers, subject to compliance with Contract Documents, are Advance, Magnetek and Sylvania.

2.3 LAMPS

A. Provide lamps of the Wattages, Types, and with color characteristics as indicated on the Fixture Schedule included with the Drawings.

B. Provide fluorescent lamps which conform to the Energy Policy Act of 1992 and the applicable ANSI Designations for the lamp wattage and type.

1. Fluorescent Lamps shall be compatible with supplied ballasts to meet the energy conservation requirements of Public Law 100-357.

C. Provide new fluorescent lamps with reduced mercury content, such as Phillips "Alto" Series Fluorescent Lamps, to meet the requirements of the EPA Resource Conservation Recovery Act for Toxic Characteristic Leaching Procedure.

1. Reduced mercury content lamps will not be required for lamp types which are not available from any of the acceptable lamp manufacturers with reduced mercury content.

D. Acceptable Lamp Manufacturers, subject to compliance with the Contract Documents are General Electric, Phillips, and Sylvania.

2.4 EXTRA STOCK

A. Provide the following extra stock of materials to the Owner.

1. Lamps: 10% , but not less than 2 of each type used on the project.

2. Fixtures lenses and louvers: 10%, but not less than 1 of each type used on the project.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Properly center fixtures in each room. Where multiple fixtures occur, space them uniformly and in straight lines with each other.

B. Locate recessed ceiling light fixtures to center on a single tile or at the intersection of four tiles.

C. Carefully lay out all openings required for recessed lighting units. Cooperate with other contractors and make provisions for openings of exact dimensions required and provide all required plaster rings and ground frames to be inserted in openings.

D. Where lighting fixtures are shown to conflict with locations of structural members and mechanical or other equipment, provide adequate supports and wiring to clear same.

3.2 SUPPORTS

A. Provide all necessary connectors, straps, etc., for secure mounting of all fixtures.

B. Secure fixtures in suspended grid type ceilings to the grid members using a device capable of holding 100% of the fixture weight acting in any direction. Provide 12 gauge galvanized steel ceiling support wires attached to grid members within 3" of each corner of the fixture. Tandem fixtures may utilize common grid member support wires.

1. Fixtures weighing less than 56 pounds in suspended grid type ceilings shall also be secured to building structure independent of the ceiling support system with a 12 gauge galvanized steel wire or #10 jack chain located at diagonally opposite corners of the fixture. These wires or chains may be slack.

a. Provide recessed can type fixtures with metal bar hangers attached to the ceiling grid system. Secure fixtures to the building structure as specified above.

b. Support surface mounted fluorescent fixtures installed on suspended grid type ceilings from the building structure by means of independent support clips equal to Caddy No. IDS with proper stud length for fixture installed, and minimum of two 12 gauge galvanized steel support wires.

2. Fixture weighing 56 pounds or more in suspended grid type ceilings shall be supported directly from the structure above by approved hangers.

C. Support recessed fixtures installed in gypsum board ceilings to the ceiling support system with metal bar hangers or suitable brackets.

D. Support surface mounted fluorescent fixtures installed on gypsum board or concrete ceilings from the ceiling with proper anchors at each corner of the fixture.

E. Fixtures designed to be supported from the outlet box will not require any additional support. Provide proper outlet box with fixture stud or plaster ring suitable to support the fixture. Secure the outlet box to the building structure with suitable anchors capable of supporting not less than 200 lbs or 4 times the fixture weight, whichever is greater.

F. Provide suspended fixtures with swivel hangers to insure plumb installation. Secure hangers to the building structure with suitable anchors capable of supporting not less than 200 lbs or 4 times the fixture weight, whichever is greater. Install hangers such that the motion of swivels or hinged joints will not cause sharp bends in conductors or damage to insulation.

3.3 LAMP BURN-IN

A. Burn-in all fluorescent lamps for a minimum of 100 continuous hours prior to completion of the project and replace all defective lamps.

3.4 COORDINATION

A. Coordinate ceiling types with General Contractor and verify compatibility with fixture mounting provisions prior to ordering fixtures. Immediately notify the Architect in writing of any discrepancies between ceiling types and specified fixture types.

B. Verify available voltages and coordinate fixture voltage with the fixture supplier prior to ordering fixtures. Immediately notify the Architect in writing of any discrepancies between available voltages and the specified fixture voltages.

C. Coordinate fixture locations with other contractors to provide adequate clearance between fixtures and ductwork, piping, structural members, etc., for proper installation of fixtures and provide access for maintenance or replacement of the fixtures.

* END OF SECTION 16500 *

SECTION 16670 - LIGHTNING PROTECTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

B. Federal Specification (Fed. Spec.)

1. W-S-610C & AM-1 Splice Conductor

C. National Fire Protection Association (NFPA) Publications

1. No. 70-2005 National Electrical Code

2. No. 780-2004 Standard for the Installation of Lightning Protection Systems

D. Underwriters Laboratories, Inc. (UL) Publications

1. Electrical Construction Materials Directory (May 1982, with Quarterly Supplements).

2. UL 96 Lightning Protection Components (1981: Rev. May 26, 1981)

3. UL 96A Installation Requirements for Lightning Protection Systems (April 9, 1982, 9th Ed.)

4. UL 467 Grounding and Bonding Equipment (1972; Rev. March 26, 1982)

1.3 GENERAL REQUIREMENTS

A. The contractor will become familiar with all details of the work, verify all dimensions in the field, and advise the Architect of any discrepancy before performing the work.

B. The system furnished under this specification will consist of the standard products of a manufacturer regularly engaged in the production of lightning protection systems and will be the manufacturer's latest UL approved design. The lightning protection system will conform to NFPA Nos. 70 and 78, UL 96 and UL 96A except where requirements in excess thereof are specified.

1.4 SUBMITTALS

A. The Lightning Protection System as shown on the Electrical Drawings indicate only minimum requirements and are included only for the Contractors' assistance in preparing bid proposals. The final design of the Lightning Protection System will be provided by a Certified Lightning Protection System Installer and submitted with the required shop drawings for review by the Owner and/or Architect.

B. Submit shop drawings in accordance with the General Conditions with a complete list of materials, including manufacturer's descriptive and technical literature; catalog cuts, drawings, and installation instructions.

1. Where materials or equipment are specified to comply with requirements of UL, submit proof of compliance. The label of or listing in the UL Electrical Construction Materials Directory will be acceptable evidence. In lieu of the label or listing, a written certificate may be submitted from an approved nationally recognized testing organization equipped to perform such services, stating that the items have been tested and conform to the requirements and testing methods of Underwriters Laboratories.

1.5 SYSTEM CERTIFICATION

A. The existing building lightning protection and grounding system was installed with a Master Label Certification. All new work and modifications to the existing lightning protection and grounding system will maintain the Master Label Certification.

B. In order to maintain the Master Label Certification, the lightning protection system additions and modifications must be installed and/or supervised by a certified lightning protection system contractor.

1. The certified lightning protection system contractor shall thoroughly review the existing system installation and design prior to beginning work and immediately the Architect of any existing conditions which may adversely affect installation of new work or maintaining the Master Label Certification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Do not use any combination of materials that form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture unless moisture is permanently excluded from the junction of such metals. Where unusual conditions exist which would cause corrosion of conductors, use conductors with protective coatings or use oversized conductors. Where a mechanical hazard is involved, increase the conductor size to compensate for the hazard or protect the conductors by covering them with molding or tubing made of wood or nonmagnetic material. When metallic conduit or tubing is used, electrically connect the conductor to the upper and lower ends of the conduit or tubing.

2.2 CONDUCTORS

A. Furnish conductors in accordance with NFPA No. 780 and UL 96 for Class I, Class II or Class III modified materials as applicable.

B. Furnish aluminum conductors weighing not less than 215 pounds per thousand feet with the size of any wire in the cable not less than No. 14 AWG.

C. Do not use aluminum in contact with the earth or any other manner that will contribute to the rapid deterioration of metal. Observe appropriate precautions at connections with dissimilar metals. Furnish conductors at least equivalent to the strength and cross sectional area of No. 4 AWG aluminum wire for bonding and interconnecting metallic bodies to the main cable. If perforated strips are used, the strips will be as much wider than solid strips, as the diameter of the perforations.

2.3 AIR TERMINALS

A. Furnish air terminals with tapered points in accordance with UL 96 and NFPA No. 780, except use Class II terminals for Class I and Class II applications.

B. Support air terminal more than 18 inches in length by a suitable brace with guides not less than one-half the height of the terminal which conform to UL 96, Class as applicable. Fasten terminal

support brackets to the roof by a method which will not adversely affect the integrity of the roofing material.

2.4 CONNECTIONS

A. Splice above-ground conductors using clamp-type connectors which conform to UL 96, Class as applicable, and Fed. Spec. W-S-610, Class 2, style and size as required for the installation.

B. Make connections to metal bodies with bonding plates which conform to UL 96, Class as applicable.

PART 3 - EXECUTION

3.1 AIR TERMINALS

A. Install air terminals rigidly connected to and electrically continuous with roof conductors by means of pressure connectors or crimped joints of T-shaped malleable metal and connected to the air terminal by a dowel or threaded fitting.

B. Secure air terminals against overturning either by means of substantial tripod or other braces permanently and rigidly attached to the building or structure.

C. Metal projections and metal objects that do not contain hazardous materials and that may be struck, but not appreciably damaged by lightning, need not be provided with air terminals. However, bond these metal objects to the lightning conductor through a metal conductor of the same unit weight per length as the main conductor.

3.2 CONDUCTORS

A. Connect roof conductors directly to the roof with clamp type connectors secured to the roof by a method which will not adversely the roofing material.

B. Avoid sharp bends or turns in conductors. Install necessary turns with a radius of not less than 8 inches. Preserve a downward or horizontal course and rigidly fasten conductors every 3 feet along the roof and down the building to ground.

C. Make all connections electrically continuous.

D. Course roof conductors along the contours of flat roofs, ridges, parapets, and edges; and where necessary, over flat surfaces in such a way as to join each air terminal to all the rest. Connect roof conductors surrounding flat surfaces and flat roofs to form a closed loop.

3.3 CONNECTIONS

A. Make all above ground connections using clamp type connectors.

B. Protect ground connections from mechanical injury.

3.4 METAL BODIES OF CONDUCTANCE

A. Protect metal bodies of conductance if not within the zone of protection of an air terminal.

B. Bond all metal bodies of conductance having an area of 400 square inches or greater, or a volume of 1000 cubic inches or greater to the lightning protection system using main size conductors and bonding plates having a surface contact area of not less than 3 square inches.

C. Make provisions to guard against the corrosive effect of bonding dissimilar metals.

D. Bond metal bodies of inductance at their closest point to the lightning protection system using secondary bonding conductors and fittings.

E. Independently ground all metal bodies that exceed 5 feet in any dimension, that are situated wholly within a building, and that do not at any point come within 6 feet of a lightning conductor or metal connected thereto.

3.5 INSPECTIONS

A. The lightning protection system will be inspected by the Owner and/or Architect or their authorized representatives to determine conformance with the requirements of this specification.

B. The certified lightning protection system contractor will make inspections during installation of the lightning protection system as required to Master Label Certification of the lightning protection system.

C. Do not conceal any part of the system until so authorized by the Owner and/or Architect or their authorized representatives.

* END OF SECTION 16670 *

SECTION 16720 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

1.2 SCOPE

A. The existing building is protected by a complete fire alarm system. Modify and extend the existing fire alarm system as required to coordination with new construction and remodeling.

B. Provide new initiating devices, notification appliances and other accessories as shown on drawings and as required.

1.3 SUBMITTALS

A. Provide submittals for the Fire Alarm System in accordance with Division 1 Specifications and Section 16000 - General Provisions, Electrical to verify compliance with the Contract Documents and the above referenced standards.

B. Provide complete submittals in accordance with the International Fire Code to include, but not be limited to, the following:

1. Building floor plan drawings showing location of the main fire alarm control panel, auxiliary control panels, initiating devices, notification appliances, control relays, pullboxes, wiring, etc., and connections to the fire alarm system.

    a. The fire alarm system drawings included with the contract documents will be made available to fire alarm system supplier in electronic format, Autocad or DXF, as requested.

2. Battery calculations to verify specified back up period.

3. Voltage drop calculations to verify all devices will operate within the device voltage limits.

4. Typical wiring diagrams for signaling line circuits, initiating device circuits, notification appliance circuits and fire safety function control circuits.

5. Provide manufacturer's standard catalog literature for all Fire Alarm System Equipment and Devices. Indicate specific item and options to be furnished where more than one item or option is included in the catalog literature.

C. Submit qualifications and certifications of personnel who will be responsible for supervision of installation, system programming, final connections, and testing.

D. In addition to routine submission of the above material, make an identical submission to the local Authority Having Jurisdiction for review. Upon receipt of comments from the Authority, resubmit if required to make clarifications or revisions to obtain approval.

1. Approval of the AHJ is required prior to installing any part of the Fire Alarm System.

PART 2 - PRODUCTS

2.1 CONTROL PANEL

A. Existing Thorn/Autocall main fire alarm control panel is to remain.

1. Provide new zone modules, control relays, etc., as required to control new fire alarm system initiating devices, notification appliances and control devices.

2. Modify the main fire alarm control programming to properly annunciate and control new fire alarm system devices.

B. Provide additional power supplies and/or batteries as required to operate the system with additional smoke detectors, notification appliances, door holders, fan shut down relays, smoke damper relays, etc.

C. Identify each new zone by specific location with neatly typed labels on the control panel and the building map.

2.2 FIRE ALARM DEVICES

A. Provide new automatic detectors which are UL Listed for use with existing Thorn/Autocall Fire Alarm Control Panel.

B. New Smoke Detectors and Heat Detectors shall be capable of being replaced without disconnecting any wires or wire connectors from the base or the detectors. Each detectors shall be installed on a separate base. Removal of any detector head from the base shall cause a trouble signal to be sounded at the main fire alarm control panel.

C. Protect existing fire alarm system devices indicated to remain. Remove smoke detector heads during demolition or construction as required to prevent excessive dust accumulation in the detector head. Clean all existing detector head upon completion of the work.

2.3 SMOKE DETECTOR

A. Provide new photoelectric type area smoke detectors with LED status indicator and twist-lock base where shown on plans.

2.4 DUCT SMOKE DETECTOR

A. Provide new duct mounted photoelectric smoke detectors with cabinet mounted alarm LED and duct sampling tubes where indicated on the drawings.

B. Provide remote mounted alarm LEDs where indicated on drawings.

C. Provide factory fabricated sampling tubes to extend the full width of the ducts.

2.5 NOTIFICATION APPLIANCES

A. Provide new Notification Appliances which meet the requirements of National Fire Alarm Code - NFPA 72, ANSI 117.1, UL Standard 1971 and ADA-AG 4.28

B. Provide new combination Horn/Strobes with flush mounting backbox and red finish where indicated on drawings.

C. Provide new Horns to produce minimum 86 dB at 10 feet. Provide new horns to match sound of existing horns in the building.

D. Provide new flashing strobe lights with lexan lens with the word "FIRE" in red letters and minimum effective candle power ratings as indicated on drawings and a flash rate of between one and two flashes per second.

2.6 ADDRESSABLE CONTROL MODULE

A. Provide addressable control modules where required to supervise and control the operation of the protected premises fire safety functions as indicated on the drawings. Control modules shall receive operating power from a signaling line circuit.

B. Provide control modules capable of being set to operate as a single pole, double throw dry contact relay with the following minimum ratings:

1. 2.0 amps at 30 VDC, resistive (1.0 power factor)
2. 0.6 amps at 30 VDC, inductive (0.60 power factor)
3. 0.3 amps at 120 VAC, pilot duty (0.35 power factor)

C. Provide control modules with an off-white impact resistant thermoplastic or lexan cover suitable for mounting in a standard 4-inch square x 2-1/8 inch deep electrical box.

D. Provide control modules with a LED that shall flash under normal conditions, indicating that the control module is operational and in regular communication with the control panel. If required, the LED flash shall have the ability to be removed from the system program.

2.7 FIRE SAFETY FUNCTION POWER RELAYS

A. Provide new control relays with SPDT contacts rated 10 amps at 120 VAC and with 24 VDC coil to control fan shut down, smoke dampers, etc., as shown on the drawings.

B. Provide fan shut down control relays in separate enclosure adjacent to the starter enclosure, or within the enclosure, of each air supply fan as shown on drawings and connect to a normally closed auxiliary contact in the fire alarm control panel. Connect the fan control circuit to the control relay output contacts so that the air supply fan will shut down upon general fire alarm.

2.8 WIRING

A. Furnish and install new copper wire for all fire alarm system wiring. Install all wiring in approved metal raceway system as specified for power wiring except that minimum 1/2" trade diameter conduit may be used.

B. Wire for Signaling Line Circuits shall be minimum #16 AWG, Twisted Pair Cable. Provide shielded cable as required by the fire alarm system manufacturer.

C. Wire for Notification Appliance Circuits shall be minimum #14 AWG, Type THHN/THWN.

D. Do not install fire alarm system wiring in raceways with any other wiring systems.

2.9 SYSTEM OPERATION

A. The existing fire alarm system operation is as follows: Activation of any initiating device will cause all notification appliances to operate, shut down all air handling fans, close all smoke dampers, release all door holders, and transmit alarm signal to the central fire station. Alarm signals may be reset or silenced by authorized personnel only by entering a locked control cabinet and operating the proper silencing switch.

B. Wire and program all new fire alarm system devices to be compatible with the existing system

operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install all raceways for initiating device circuits and notification appliance circuits with separate raceways entering and leaving each outlet box and/or enclosure.

1. Wire the fire alarm system signaling line circuits in a Class A, Style 6 loop in accordance with NFPA 72-2007.

2. Wire the fire alarm system notification appliance circuits in a Class A, Style Z loop in accordance with NFPA 72-2007.

B. Color code fire alarm system wiring as recommended by the manufacturer to match the existing fire alarm system color coding. Tag all conductors according to zone circuit at all terminals, pull and junction boxes.

C. Paint all fire alarm system junction boxes, pull boxes, etc. red with identification of zones served indicated on the device or box.

D. Supervision of installation, final connections, programming and testing will be provided by a trained factory representative of the existing fire alarm system manufacturer.

1. Contact: SimplexGrinnell
1272 West 2240 South, Suite A
Salt Lake City, Utah 84119
(801) 262-4242 or (801) 262-9406

3.2 SYSTEM OUTAGES

A. The existing Fire Alarm System will remain completely operational throughout construction except portions may be temporarily taken out of service for reconnections as indicated on the drawings.

1. Submit requests for fire alarm system outages to the DFCM Project Manager not less than 7 day prior to any proposed fire alarm outages.

2. Immediately notify the DFCM Project Manager if the fire alarm is unintentionally disabled and immediately make repairs to restore the system to an operational condition.

3. The contractor shall maintain a fire watch during all fire alarm system outages in accordance with International Fire Code Section 901.7.

4. Do not leave any portion of the fire alarm system inoperable longer than is absolutely necessary to make reconnections.

5. Provide temporary supports, wiring and/or connections as required to maintain the system in an operable condition.

3.3 RECORD DRAWINGS

A. Provide new building map for the existing control panel to reflect floor plan changes, new initiating devices locations and new initiating devices address numbering. Mount the building map behind a protective plastic covering.

B. Update existing fire alarm system record drawing to include locations and wiring of new devices

and equipment as installed. Include junction box locations and detector and pull station wiring.

3.4 TESTS

A. At the time of the final inspection, test each new and/or modified zone to show that all equipment is in proper working order.

1. Tests shall be conducted in the presence of the Authority Having Jurisdiction, Owner and Architect and/or Engineer.

B. Provide two-way radios, canned smoke and a hair dryer (or other means to set off smoke and heat detectors).

C. Test each detector of each modified zone and open each zone to test the Class A loops.

D. Put the main control panel on battery power not less than 24 Hours prior to Final Inspection. The batteries shall maintain the fire alarm system in supervisory mode for not less 24 Hours and then be able to operate all notification appliances continuously for not less than 10 Minutes.

E. All devices will be complete and operational.

3.5 TRAINING

A. In addition to any detailed instructions called for, the Contractor must provide, without additional expense to the Owner, competent instruction to train the Owner's personnel who will be in charge of the system, in the care and operation of the modified portions of the system. Instruction date will be set at time of final inspection.

* END OF SECTION 16720 *

SECTION 16740 - TELEPHONE/DATA SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Division 1 Specification Sections and Section 16000 - General Provisions, Electrical apply to work of this section.

B. Section 16110 - Raceways

C. Section 16130 - Electrical Boxes

1.2 SCOPE

A. Provide a complete raceway system, junction boxes, outlet boxes, and coverplates as shown on drawings and as specified herein.

B. Telephone/data instruments and cable will be provided by others.

PART 2 - PRODUCTS

2.1 RACEWAY SYSTEM

A. Provide a complete telephone/data raceway system as specified in Section 16110 - Raceways, except minimum raceway size will be 1".

B. Provide an outlet box at each telephone/data outlet location as specified in Section 16130 - Electrical Boxes, except that minimum outlet box size will be 4-11/16" Square x 2-1/8" deep.

2.2 COVERPLATES

A. Provide a blank coverplates on each telephone/data outlet to match color and style of wiring device coverplates.

PART 3 - EXECUTION

3.1 PULL STRING

A. Provide a nylon or polypropylene pull string with not less than 200 lb tensile strength in all telephone/data conduits. Leave 18 inches slack string coiled at each end of all raceways. Provide a hard cardboard tag for each raceway at all terminal boards, terminal cabinets, etc. to indicate location of the outlet to which the raceway is connected.

3.2 COORDINATION

A. Coordinate installation of telephone service with local telephone company prior to beginning work.

* END OF SECTION 16740 *